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The Economic Impact of Vapor Recovery Regulations on the Service Station Industry

Arthur D. Little, Inc.
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16. ABSTRACT

The report assesses the potential economic impact resulting from EPA's Stage II vapor recovery regulations covering gasoline refueling facilities in specified Air Quality Control Regions. Four general subject areas are addressed in the seven tasks which compose the impact study: (1) Number, throughput, and ownership patterns of dispensing facilities in the AQCRs'; (2) economic affordability of vapor recovery equipment investment; (3) capital availability for vapor recovery equipment investment for various types of ownership classes.

The report identifies the segments of the retail gasoline industry that are likely to be impacted by the regulations.

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by

Paul E. Mawn

Arthur D. Little, Inc.
25 Acorn Park
Cambridge, Massachusetts

DOL Contract No. J-9-F-6-0233

EPA Project Officer: Kenneth H. Lloyd

Prepared for

DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
200 Constitution Avenue
Washington, D.C. 20210

and

ENVIRONMENTAL PROTECTION AGENCY
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i.b

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Publication No. EPA-450/3-78-029

TABLE OF CONTENTS

Page

List of Figures vi

List of Tables vii

INTRODUCTION 1

I. EXECUTIVE SUMMARY 3
- A. INTRODUCTION AND BACKGROUND 3
- B. SERVICE STATION MARKET AUDIT 4
- C. "PRIVATE" GASOLINE OUTLET 6
- D. THE ECONOMIC IMPACT OF VAPOR-RECOVERY SYSTEMS 8

II. NATIONAL AUDIT OF SERVICE STATIONS 25
- A. PURPOSE 25
- B. AUDIT SUMMARY 25
- C. METHODOLOGY 29
- D. TOTAL U.S. SERVICE STATION MARKET 30
- E. U.S. SERVICE STATION OWNERSHIP PATTERNS 33

III. AUDIT OF "PRIVATE" GASOLINE-DISPENSING FACILITIES (1977) 39
- A. SUMMARY 39
- B. METHODOLOGY 40
- C. REGIONAL DISTRIBUTION 41
- D. PRIVATE GASOLINE-DISPENSING SEGMENTS 45

IV. RETAIL GASOLINE MARKETING ECONOMICS AND TRENDS 51
- A. INTRODUCTION 51
- B. GASOLINE MARKETING DYNAMICS 51
- C. RETAIL GASOLINE SUPPLY LOGISTICS 53

TABLE OF CONTENTS (Continued)

Page

D. RETAIL GASOLINE MARKETING SEGMENTS 57

E. CURRENT SERVICE STATION ECONOMICS 57

F. SERVICE STATION POPULATION OUTLOOK WITHOUT VAPOR RECOVERY 70

V. VAPOR-RECOVERY INVESTMENT REQUIREMENTS 75

A. INTRODUCTION AND SUMMARY 75

B. TOTAL COSTS OF VAPOR RECOVERY 78

C. VAPOR RECOVERY INVESTMENT-INTEGRATED OIL COMPANIES 80

D. VAPOR-RECOVERY INVESTMENT-INDEPENDENT MARKETERS 84

E. ILLUSTRATIVE INDEPENDENT MARKETER PROTOTYPES 85

VI. IMPACT OF VAPOR-RECOVERY CAPITAL INVESTMENT REQUIREMENTS ON INDEPENDENT MARKETERS 91

A. INTRODUCTION 91

B. IMPACT OF VAPOR RECOVERY INVESTMENTS ON PROTOTYPE FINANCIAL CONDITIONS 91

C. FINANCIAL CLIMATE FOR VAPOR-RECOVERY LOANS 93

D. BALANCE SHEET CRITERIA USED BY LENDERS 97

E. INSTITUTION SOURCES OF CAPITAL FOR VAPOR RECOVERY LOANS 103

F. CONCLUSIONS AS TO THE ABILITY OF INDEPENDENT MARKETERS TO OBTAIN VAPOR-RECOVERY FINANCING 106

TABLE OF CONTENTS (Continued)

Page

VII. VAPOR-RECOVERY IMPACT ON SERVICE STATION PROFITABILITY 111

- A. FINANCIAL ASSUMPTIONS 111
- B. VAPOR RECOVERY COST IMPACT ON RETAIL GASOLINE MARGINS 114
- C. VAPOR-RECOVERY IMPACT ON SERVICE STATIONS PROTOTYPES 117
- D. SUMMARY 125

VIII. VAPOR-RECOVERY IMPACT ON THE SERVICE STATION POPULATION 127

- A. CLOSURES INDUCED BY THE COSTS OF VAPOR RECOVERY 127
- B. SERVICE STATION POPULATION FORECAST - AFTER VAPOR RECOVERY 130
- C. TOTAL VAPOR-RECOVERY COST FOR THE ADJUSTED SERVICE STATION POPULATION 132

LIST OF FIGURES

Figure No.		Page
1 1	Petroleum Administration for Defense (PAD) Districts	26
2 2	U.S. Service Station Decline (1972 - 1980)	54
3 3	Gasoline Distribution Network	56
4 4	Service Station Operating Expenses	61
5 5	Break-Even Volumes for Typical Prototype Stations	72

LIST OF TABLES

Table No.		Page
1	Service Station Population (1977)	6
2	"Private" Gasoline Outlets (1977)	7
3	Vapor-Recovery Costs for "Private" Outlets	8
4	Total Vapor-Recovery Costs	9
5	Vapor-Recovery Impact Upon Independent Marketers	11
6	Retail Service Station Prototypes	13
7	Service Station Closure Forecast - Before Vapor Recovery (1977-1981)	14
8	Net Vapor Recovery Costs	16
9	Break-Even Point Volumes - After Vapor Recovery	18
10	Potential Profitability-Induced Closures After Vapor-Recovery	19
11	Service Station Closures (1977-1978) with Vapor Recovery	21
12	Service Station Forecast (1981)	22
13	U.S. Service Station Population Summary by Direct Supplier Mid-Year 1977	28
14	U.S. Service Stations Throughput Summary Mid-Year 1977	29
15	Summary of Service Station Audit	32
16	U.S. Service Station Control by Type Operation	35
17	Audit of "Private" Gasoline Outlets	42
18	Audit of "Private" Gasoline Outlets - Six AQCR'S	44

LIST OF TABLES (Continued)

Table No.		Page
19	Total Gasoline Facilities by PADD	46
20	Estimated U.S. Gasoline Consumption (1977)	47
21	U.S. Service Station	58
22	Comparison of Retail Dealer Gross Margin for Regular Gasoline to the Consumer Price Index (CPI)	60
23	Banked Cost for Top 30 Refiners	63
24	Service Station Prototype Throughput Ranges	66
25	Total Service Station Gross Margin	67
26	Illustrative Non-Gasoline Sales Contribution Margin	68
27	Service Station Operating Expenses	69
28	Service Station Prototypes Net Margin Summary	70
29	Break-Even Volumes of Service Station Prototypes	71
30	Potential Service Station Closures Based on Outlets Now Operating Below the Prototype Break-Even Point	73
31	Estimated Impact of Service Station Attrition	74
32	Retail Outlet "Control" Audit	76
33	National Vapor-Recovery Capital Requirements	77
34	Service Station Population Vapor-Recovery Costs (1977)	79
35	Total Vapor-Recovery Costs	80
36	Integrated Company Capital Requirement for Vapor Recovery	82

LIST OF TABLES (Continued)

Table No.		Page
37	Vapor-Recovery Impact on Current Environmental Capital Budget of Integrated Oil Companies	83
38	Summary of Independent Marketer Prototypes	87
39	Open Dealer Audit	89
40	Prototype Financial Summary	92
41	Vapor-Recovery Impact on Independent Marketer	94
42	Gasoline Service Station Returns	95
43	Financial Summary of PMEF Jobber	96
44	Vapor-Recovery Debt Requirements of Independent Marketer Prototype	98
45	Insurance Industry Debt Index	102
46	Proforma Cash Flow	102
47	Estimated Closures of Small Jobbers/Open Dealer Outlets Due to Inability to Raise Capital for Vapor Recovery	108
48	Potential Closures of Independent Outlets Due to Lack of Capital for Vapor Recovery	110
49	Capital Charges for Vapor-Recovery Financing	112
50	Costs of Vapor-Recovery Compliance in High-Volume Sector	115
51	Costs of Compliance in Low-Volume Sector	116
52	Economic Impact in Service Stations: Change in Break-Even Throughput Volume Assuming Competitive Passthrough of Costs	118
53	Economic Impact on Lessee Dealer Prototype Station	120

LIST OF TABLES (Continued)

Table No.		Page
54	Economic Impact on Direct Operation (Major Oil Company) Self-Service Prototype Station	121
55	Economic Impact on Open Dealer Full-Service Prototype Station	122
56	Economic Impact on Direct Operation (Independent) Self-Service Prototype Station	123
57	Economic Impact on Convenience Store Self-Service Prototype Station	124
58	Marginal Stations Below Prototype Break-Even Point Volumes Before Vapor Recovery Costs	128
59	Potential Vapor Recovery-Induced Closures -- Break-Even Point Method	129
60	Forecast of 1981 Service Station Population After Vapor Recovery	131
61	Service Station Population Outlook	133
62	Total Vapor-Recovery Costs for the 1981 Population of Service Stations	134
63	Stage I Capital Constraints	136
64	Stage I-Induced Closures Due to Insufficient Profitability	137

TABLE OF CONTENTS

Page

APPENDIX A - REFINER/MARKETER LIST A-1

APPENDIX B - SERVICE STATION THROUGHPUT MATRIX B-1

APPENDIX C - SERVICE STATION SUPPLIER/OPERATIONAL PROFILES C-1

APPENDIX D - "PRIVATE" GASOLINE DISPENSING OUTLETS 6 SAMPLE AQCR'S D-1

APPENDIX E - "PRIVATE" GASOLINE DISPENSING OUTLETS TOTAL U.S.A. AUDIT E-1

APPENDIX F - OUTLOOK FOR THE SERVICE STATION POPULATION: SELECTED PRESS REFERENCES F-1

APPENDIX G - SUMMARY OF GASOLINE BANKED COSTS G-1

APPENDIX H - VAPOR RECOVERY COSTS PROVIDED BY THE EPA H-1

APPENDIX I - THE IMPACT OF VAPOR RECOVERY CREDIT ON SERVICE STATION ECONOMICS I-1

APPENDIX J - SERVICE STATION PROTOTYPES OPERATIONAL AND ECONOMIC PROFILES J-1

APPENDIX K - VAPOR RECOVERY CAPITAL INVESTMENT BY RETAIL GASOLINE MARKETING SEGMENT K-1

APPENDIX L - INDEPENDENT MARKETER PROTOTYPE COMPANIES OPERATIONAL AND FINANCIAL PROFILES L-1

APPENDIX M - CORPORATE PROTOTYPE FINANCIAL RATIOS M-1

APPENDIX N - PRO FORMA ANALYSIS OF CASH FLOW AVAILABLE TO SERVICE ANNUAL DEBT AFTER VAPOR RECOVERY N-1

APPENDIX O - ECONOMIC IMPACT WORKSHEETS O-1

APPENDIX P - VAPOR RECOVERY INVESTMENT FOR ESTIMATED 1981 SERVICE STATION POPULATION P-1

APPENDIX Q - STAGE I VAPOR RECOVERY WORKSHEETS Q-1

INTRODUCTION

Regulations to control benzene emissions on a national basis are currently being evaluated by OSHA and the EPA. One control strategy to effect this objective would be to capture and recover benzene as well as other hydrocarbons at filling station islands with on-site vapor-recovery systems. The purpose of this analysis is to address the following questions related to such a vapor-recovery program:

• WHO ...	would be economically affected by vapor-recovery programs (i.e., retailers, the public, etc.)?
• WHAT ...	would be the total additional cost of vapor recovery in each of the various segments of the retail market?
• WHERE ...	would the capital for vapor recovery be obtained by the independent marketers?
• HOW ...	would the added financial costs of vapor recovery affect the retail service station market?

To assess the economic impact of a national vapor recovery program, a market audit of the various segments of gasoline retailing was undertaken. The purpose of this initial task was to define the current number of retail outlets in various throughput ranges as well as by direct supplier and type of operation. The total amount of benzene emitted from gasoline as it is being unloaded or pumped into vehicles is the sum of vapors at both service stations and "private" gasoline dispensing outlets (e.g., commercial/industrial gasoline pumps). As requested by OSHA and the EPA, a second market audit was also made to determine the number of these "private" facilities that dispense gasoline in the country.

The economic implications of a national vapor recovery program were evaluated only for retail service stations. This assessment included an analysis of both the capital requirements for vapor recovery as well as its impact on service station profitability. The financial hurdles faced by independent marketers in obtaining vapor-recovery capital were then reviewed. Based upon comments from both gasoline retailers and financial institutions, a subjective estimate of potential service station closures due to unavailability of capital for vapor-recovery investments was made by the Arthur D. Little case team.

The net cost of vapor-recovery systems at "typical" prototype service stations was used as an illustrative tool to evaluate the changes in outlet profitability brought about by various cost pass-through assumptions for vapor recovery. Based upon current service station economics, the number of marginal retail outlets operating below break-even point volumes was evaluated before and after vapor-recovery costs were added. Potential closures due to vapor recovery were assumed to result from either the non-availability of added capital for vapor-recovery investments or unsatisfactory profitability after the absorption of some level of added vapor recovery expenses.

In summary, the organization of this analysis of the impact of vapor-recovery systems to control benzene emissions follows:

Chapter Title	Chapter No.
Executive Summary	I
National Audit of Retail Service Stations (1977)	II
Audit of "Private" Gasoline-Dispensing Facilities (1977)	III
Retail Gasoline Marketing Economics and Trends	IV
Vapor-Recovery Investment Requirements	V
Impact of Vapor-Recovery Capital Investment Requirements on Independent Marketers . .	VI
Vapor-Recovery Impact on Service Station Profitability	VII
Vapor-Recovery Impact on Service Station Population	VIII

I. EXECUTIVE SUMMARY

A. INTRODUCTION AND BACKGROUND

The purpose of this report is to assess the likely economic impact of a national vapor-recovery program to control benzene emissions from gasoline at service stations. The initial task in this effort was to define which gasoline marketers would be affected and by how much. To address these questions, a marketing audit of the current service station population had to be made. Vapor-recovery cost information provided by the EPA was then applied to the outlet population for various segments of the industry to define the following:

- Total cost of vapor-recovery investment, financing, and operating expenses;
- Estimated number of potential closures due to an inability to obtain vapor-recovery capital; and
- Potential closures due to insufficient profitability as a result of vapor-recovery costs.

In addition to an analysis of the service station population, an audit of all other gasoline-dispensing facilities was made at the request of EPA/OSHA. An economic impact assessment of vapor recovery on the wide variety of direct gasoline consumers is not within the scope of this report. One purpose of the "private" gasoline dispenser audit was to understand the role of retail outlets within the total population of gasoline-dispensing facilities. From this information, the total emission of benzene from gasoline-dispensing operations could be estimated by the EPA.

At the present time, the petroleum industry is undergoing dynamic structural changes. In the past, crude production was the most profitable activity of integrated oil companies with refining and marketing strategies designed to maximize the flow of oil from the wellhead. However, "stand-alone" economics is now the dictum in the oil industry, and each functional area must meet the corporate return on investment criteria. This recent change in business philosophy has produced a dramatic evolution in petroleum marketing strategy. The service station industry has been particularly impacted, resulting in a market rationalization process which is significantly reducing the number of retail outlets and changing the historic control/operational patterns of retail gasoline marketing.

B. SERVICE STATION MARKET AUDIT

In the summer of 1977, there were approximately 178,000 gasoline stations in the United States. More than 48,000 of these service stations have closed since the population peak of 226,000 stations in 1972. This attrition is expected to continue at least through the early 1980's to a leveling-off point of anywhere from 125,000 to 150,000 outlets. The economies of scale of high-volume stations and the shift to self-service operations are prime factors in shrinking retail margins. Consequently, the closure of outlets due to market rationalization processes will be most severe for those outlets which have relatively low sales volume coupled with high unit expenses.

The data base for a national analysis of the service station industry by throughput and type of operation is not publically available. A detailed survey of service station facilities was undertaken by Arthur D. Little with both major and independent oil companies. The results of this audit were combined with our in-house knowledge and publicly available information to derive the following:

- Outlets by throughput range,
- Outlet control profile, and
- Market share by direct supplier.

Major oil companies and regional refiner marketers supplied more than half of the retail service stations in the country with the remaining 43% supplied by independent marketers. All petroleum marketers retail their gasoline through one of the following types of operations:

- Direct salary operation-supplier-"controlled"/supplier-operated,
- Lessee dealer-supplier-"controlled"/lessee dealer-operated,
- Open dealer-dealer-"controlled"/dealer-operated, or
- Convenience store with separate gasoline profit center located at a relatively new food/convenience store.

The traditional retail marketing strategy of major oil companies has been to operate through lessee dealers. These lessee outlets still represent approximately 66% of the major oil company stations and almost 50% of all stations in the country. It is presumed that suppliers would have to provide the investment capital to have their lessee dealers implement a national vapor-recovery program.

The second largest group of outlets are known as open dealers. In these operations, the on-site dealer actually owns or controls the investment in his station where he is physically employed. Open dealers represent more than 33% of the retail outlets in the United States. They are generally branded* and supplied either directly by a major oil company or a branded jobber. Direct salary operations and convenience stores are low-expense, low-margin operations which account for less than 25% of the total population of gasoline retailers. A summary of the service station market segments reviewed in this audit is presented in Table 1.

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*That is, a station operating under the brand identification of a major oil company; unbranded stations use local and/or independent brands.

TABLE 1. SERVICE STATION POPULATION (1977)

Supplier	% Total 1977 Outlets**				
	Type of Operation				
	Direct	Lessee	Open Dealer	"C" Store*	Total
Major	3.6	28.2	15.6	0.4	47.8
Regional Refiner	2.3	5.3	1.1	0.1	8.8
Independent Marketer/ Wholesaler-"Super Jobber"	9.3	2.5	0.6	4.3	16.7
Small Jobber	2.3	10.9	12.3	0.6	26.7
Total	18.0	47.0	30.0	5.0	100.0

*Convenience Store
**Approximately 178,000 outlets

C. "PRIVATE" GASOLINE OUTLET

In addition to conducting an audit of current service stations, the EPA/OSHA requested that Arthur D. Little estimate the total number of gasoline-dispensing facilities in the country. However, an economic impact analysis of this highly diversified mix of commercial and industrial gasoline consumers was not deemed practical within the current scope of work.

A market audit of the number of these "private" gasoline-dispensing facilities in the United States is also not publicly available. This data base was then developed by Arthur D. Little on a national basis from a variety of U.S. Government statistical sources (e.g., the Bureau of Census, Departments of Transportation, Defense, and Agriculture and the FEA). Gasoline outlet and consumption estimates for a few segments were based upon extensive surveys with trade groups and private gasoline consumers (e.g., taxis, buses, etc.).

To understand the nature of "private" gasoline demand in concentrated metropolitan areas, the EPA requested that this "private" gasoline audit also be carried out in six specific air quality control regions (AQCR's).

We estimated that approximately 243,000 outlets dispense gasoline in addition to the conventional retail service stations (see Table 2). Approximately 40% of these "private" gasoline pumping outlets are utilized by some public service organization (e.g., miscellaneous government agencies and/or various types of utilities). Slightly more than 20% of the outlets provide fuel to miscellaneous short-haul trucks (including agriculture applications). However, the gasoline demand pattern in the metropolitan areas of the sample AQCR's shows a much higher population of short-haul truck outlets (66% of the total) than public service outlets (21%).

TABLE 2. "PRIVATE" GASOLINE OUTLETS (1977)
(National Basis)

Sector	Gasoline Outlets	Total Outlets (%)
Trucking/Agriculture	54,500	23
Utilities/Government	95,010	39
Other	93,420	38
Total	242,930	100

There are far more "private" gasoline facilities than retail service stations in the United States. However, only 1% of these "private" facilities have a throughput greater than 20,000 gallons per month. "Private" pump sites represent 58% of the gasoline-dispensing outlets, but they dispense only 23% of the total gasoline volume in the country. On average, service station throughput volumes are more than 4-1/2 times larger than those of the average "private" gasoline pumping facility.

If all of the "private" gasoline outlets had to add vapor-recovery systems, the total vapor-recovery cost for these types of facilities would range from \$1.6 to \$3.8 billion, as shown in Table 3. This would increase the unit costs of dispensing gasoline at these "private" outlets from \$0.0060 to \$0.0138/gallon.

TABLE 3. VAPOR-RECOVERY COSTS FOR "PRIVATE" OUTLETS*
(\$Million)

	Type Vapor-Recovery System	
	Balance	Vacuum Assist
Investment	1,045	2,113
Financing Cost	311	630
10 Years - Operating Exp.	291	1,032
Total Cost	1,647	3,775
Unit Cost**	0.0060	0.0138

*Two nozzles per outlet assumed.
**Unit costs are based upon a volume divisor of 273.8 billion gallons over a 10-year period (i.e., 1.8% growth rate).

D. THE ECONOMIC IMPACT OF VAPOR-RECOVERY SYSTEMS

An underlying purpose of this economic impact analysis is to estimate the potential number of gasoline retailers which might be driven out of business by vapor-recovery regulations. In addition to service station closures due to current market rationalization factors, retail gasoline outlets may be closed as a result of a national vapor-recovery program for the following two reasons:

- Inability to raise the required capital for vapor-recovery investments; and
- Having raised the capital, the added absorbed expense of vapor recovery may not provide an adequate level of profitability.

1. Capital Requirements of a National Vapor-Recovery Program

Depending on the type system, the total cost of vapor-recovery for the current population of 178,000 service stations would range from $2.8 to $4.0 billion. As shown in Table 4, the initial investment for the vapor-recovery installations would equal approximately 50% of the total cost for a national vapor-recovery program. The balance of the total cost would cover the financing charge and operating expenses. Over a 10-year life for vapor-recovery systems, the added cost for such a program would range from $0.0030 to $0.0043 per gallon of retail gasoline sold.

TABLE 4. TOTAL VAPOR-RECOVERY COSTS

Cost	Type System	
	Balance	Vacuum Assist
Capital Investment	50%	52%
Financing	17%	18%
10 Years' Cumulative Operating Expenses*	33%	30%
Total Cost	100%	100%
Total Cost ($MM)	2763	4029
Unit Cost ($/gal)**	0.0030	0.0043

*Representing the assumed project life for vapor-recovery systems, according to the EPA.
**Volume divisor = 932 billion gallons over 10 years (1.8%, P.A., growth rate in gasoline demand).

The cost of vapor-recovery for each retail gasoline segment would be roughly proportional to the total number of outlets controlled by that segment (i.e., direct investment or long-term leases). The integrated refiner/marketers (i.e., majors plus regional refiners) control 40% of the total number of stations in the country and would be required to spend approximately 40% of the total capital outlay for vapor-recovery (i.e., $545 to $842 MM). For a vapor-recovery program phased over three years, this level of investment would roughly double the current capital expenditure for environmental controls by the integrated refiner/marketers. Depending upon the type system, vapor-recovery would then absorb from 12% to 23% of the current annual marketing capital budget for this segment of the industry. However, it is unlikely that any major/regional refiner stations would close exclusively due to an inability to acquire the necessary capital for vapor-recovery systems. Service stations closures by these two groups of refiners will be primarily driven by market forces when the sites provide marginal returns relative to the supplier's alternative use value for these facilities.

If all of the current service station population required vapor-recovery systems, independent marketers collectively would be responsible for approximately 60% of the investment cost for this program (i.e., $828 MM to $1273 MM). The ability of the various types of independent marketers to obtain the capital necessary for vapor-recovery has been seriously questioned. Since there are more than 62,000 different independent gasoline-retailing organizations in the United States, corporate pro forma summaries were developed as a tool to assess the factors which impact upon the ability of the "typical" independent marketer to acquire the necessary funds for vapor-recovery. As shown in Table 5, vapor-recovery systems would represent investments equal to from 13% to 36% of the total net worth of four key types of independent gasoline retailers.

TABLE 5. VAPOR-RECOVERY IMPACT UPON INDEPENDENT MARKETERS

Independent Marketer Prototype	Vapor Recovery Investments as a Percent of Net Worth	
	Balance System	Vacuum Assist System
Independent Marketer/ Wholesaler	19	29
Super Jobber	15	22
Small Jobber	22	36
Open Dealer	13	21

Commercial bankers will generally be the only source of vapor-recovery capital for eligible independent marketers.

The ability of each company to obtain vapor-recovery financing is quite company specific and a function of the historical relationship of the loan applicant with his banker and the attractiveness of his current balance sheet. Independent marketers applying for vapor-recovery loans will generally have to overcome a negative reaction of bankers to the following factors:

- Downward trend in gasoline retailing margins,
- Unattractive nature of vapor-recovery systems as collateral (i.e., limited use and discounted auction value);
- Questionable debt service ability after vapor-recovery, especially with already highly leveraged independents; and
- Continued uncertainty associated with various federal price controls.

The nature of vapor-recovery collateral and the financial characteristics of most independent marketers tend to rule out other sources of vapor-recovery capital (i.e., insurance and finance companies, Small Business Administration, etc.).

The number of service stations assumed closed by an inability to acquire capital required for vapor-recovery was estimated, based upon the following factors:

- The trend of current service station closures,
- Estimates of marketers to whom loans would not be granted by contacts in various financial institutions,
- Comments elicited from lending officers relating to a pro forma loan application of the prototype independent marketers for vapor-recovery financing, and
- Discussions with large and small independent marketers regarding their implementation strategy for a national vapor-recovery program.

It is estimated that approximately 29,000 service stations would have to close because of the inability of independent marketers to obtain vapor-recovery financing. This number of closures represents 25% of the current population. However, it is reasoned that at least 66% of these stations would be closed by normal market forces with or without vapor-recovery. Thus, the net long-term impact of capital constraints for vapor-recovery, it is estimated, would induce only 6,000 additional closures (i.e., 8% of the current population).

2. Vapor-Recovery Impact on Profitability

After the investment has been made, vapor-recovery systems will impact the profitability of service stations to varying degrees, depending upon the following:

- Type of service station operation (see Table 6),
- Throughput of the particular retail outlet,
- Type of vapor-recovery system utilized, and
- Competitive constraints in passing through the added costs of vapor-recovery.

The economic and operational profiles of various types of retail gasoline outlets were developed to assess net margins before and after the addition of vapor-recovery costs (see Table 6).

TABLE 6. RETAIL SERVICE STATION PROTOTYPES

Type Station	Direct Supplier	Throughput		
		Low	Medium	High
Lessee	Any	20	35	80
Direct Operation	Major	50	100	150
Direct Operation	Independent	100	150	200
Open Dealer	Any	10	30	50
"C" Store	Any	10	20	35

Even without vapor-recovery costs, all the low-volume service station prototypes shown in Table 6 have negative net margins,* except for the convenience stores. Typical income statements developed for these prototypes are based upon average margins from industry trade journals and actual operating data from industry contacts. The break-even point volume for the various service station prototypes before vapor-recovery is shown in Table 7. Based upon the 1977 service station population, approximately 78,000 (i.e., 44% of the total population), outlets theoretically fall below the break-even volume for the five service station prototypes as a result of the highly competitive market for retail gasoline. However, many of these stations will continue to remain open, despite negative accounting margins based upon a positive cash flow from depreciation and/or a reduction of dealer's take-home pay.

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*Including depreciation and a dealer salary as expenses, but before federal income tax (BFIT).

TABLE 7. SERVICE STATION CLOSURE FORECAST - BEFORE VAPOR RECOVERY (1977-1981)

Type Station	Service Station Population (1977)	Break-even Point Volume (000 gal/mth)	Stations Below Prototype Break-even Volumes as a Percentage of the 1977 Population	Estimated Net No. of Closures as a Percentage of the 1977 Population
Lessee	83690	28	54	35
Direct Majors	10330	92	75	15
Direct Independent	21740	108	80	24
Open Dealers	53030	15	15	6
"C" Stores	9600	6	-	-
Total	178390	-	44	22

Based upon discussions with industry representatives and various articles in trade publications, it is estimated that approximately 40,000 stations in the current population will be closed as a result of market rationalization factors, even before the added burden of vapor-recovery costs. However, it is expected that some additional convenience stores will be added over the next few years so that the total number of net service stations in 1981 will be approximately 84% of the current population, excluding impact of any vapor-recovery requirements.

For structural simplicity of the impact analysis, two retail gasoline marketing environments have been defined (i.e., high-volume and/or low-cost operations and a segment consisting mainly of low-volume/high-cost outlets). It is further assumed that the ability to passthrough the cost of vapor recovery by all operators is limited to the net cost of the most efficient marketer in each of the above two sectors. Based upon installation costs provided by the EPA, the actual net cost per gallon for vapor recovery systems is greatly dependent upon the throughput of the station as shown in Table 8. The high-volume, direct-salary, major oil company facility is the most efficient operator in the high-volume/low-cost sector with a net cost of $0.0008/gallon for the balance vapor-recovery system and $0.0012/gallon for vacuum assist. In the low-volume/high-cost sector, the high-volume open dealer would have the lowest net vapor-recovery cost (i.e., $0.0033 - balanced and $0.0055/gallon - vacuum assist). The high fixed-cost component of vapor recovery for the most part will reinforce the existing economies of scale prevalent in retail gasoline marketing.

TABLE 8. NET VAPOR RECOVERY COSTS
($/gal)

Type Station	Low-Volume Range		High-Volume Range	
	Balance	Vacuum Assist	Balance	Vacuum Assist
Lessee	0.0060*	0.0150*	0.0015	0.0025
Direct Salary (major)	0.0030	0.0045	0.0008	0.0012
Direct Salary (independent)	0.0019	0.0029	0.0007	0.0013
Convenience Store	0.0075	0.0175	0.0018	0.0046
Open Dealer	0.0130*	0.0250*	0.0033*	0.0055*

*Low-volume/high-cost market sector. All other operations are assumed to be in the high-volume/low-cost segment.

3.0 POTENTIAL "PROFITABILITY" - INDUCED CLOSURES OF SERVICE STATIONS AFTER VAPOR RECOVERY

After the closure of stations due to a failure to raise capital, the second impact of vapor recovery will be to raise the break-even threshold volume for different types of service stations from the current levels to a higher volume. With all other investments being equal, the increased volume required to cover added vapor-recovery costs is a function of the degree to which these added costs can be competitively passed on to the public as well as the type of vapor-recovery systems employed. The number of stations which fall above the break-even point, based upon current economics, but below the break-even volume after vapor-recovery costs are assumed to represent the number of potential station closures as a result of vapor-recovery. However, it is unlikely that all of these stations will actually be closed, just as all of the stations currently operating below the accounting break-even point will not be closed. The revised break-even volume after vapor-recovery for various pass-through scenarios are shown in Table 9. Based on the Arthur D. Little service station audit, the number of outlets operating between the break-even volumes before and after vapor-recovery are shown in Table 10.

This number of stations put into a marginal operating condition (i. e., below break-even volume) by vapor recovery could range from 13,000 to 43,000 service stations. The greatest number of potential closures will be open dealers as this group has the largest number of stations operating between the break-even volumes before and after vapor-recovery.

By 1981, the net 1977 service station population will be decreased by closures due to "normal" market rationalization processes without vapor-recovery less net new station construction. If a national vapor-recovery program is implemented, additional closures could result from:

TABLE 9. BREAK-EVEN POINT VOLUMES -- AFTER VAPOR RECOVERY

Type Station	Prevapor Recovery Break-even Point (000 gal/mo)	Competitive Pass-through	Balance System Adjusted Break-even Point (000 gal/mo)	Vacuum Assist System Adjusted Break-even Point (000 gal/mo)
Lessee	27.5	yes	28 3	28.3
Lessee	27.5	no	34.2	48.3
Direct - major	91.7	yes	95.0	95.8
Direct - major	91.7	no	98.3	100.0
Open dealer	15.4	yes	17.9	20.0
Open dealer	15.4	no	19.6	23.3
Direct - independent	108.3	yes	111.2	112.5
Direct - independent	108.3	no	113.3	115.4
Convenience store	5.8	yes	9.6	13.7
Convenience store	5.8	no	10.0	15.0

TABLE 10. POTENTIAL PROFITABILITY-INDUCED CLOSURES AFTER VAPOR-RECOVERY

Type Station	Competitive Pass-through	Balance System "Profitability-" Induced Closures	Vacuum Assist System "Profitability-" Induced Closures
Lessee	yes	325	305
Lessee	no	6473	18974
Direct - major	yes	97	114
Direct - major	no	149	187
Open dealer	yes	12225	17573
Open dealer	no	16017	21368
Direct - independent	yes	61	84
Direct - independent	no	111	164
Convenience	yes	233	1648
Convenience	no	360	2562
Total	yes	12921	19724
	no	23116	42875

- An inability to obtain the necessary capital for vapor-recovery investments; and
- Stations making vapor-recovery investments whose profitability is then impaired by the ability to pass through all vapor-recovery costs.

It is reasoned that vapor recovery-induced closures due to the inability to raise capital will first be made at the stations which would have been closed due to market rationalization forces. As illustrated for the balance system case in Table 11, the net closure impact of vapor-recovery is equal to the additional stations closed in each sector over and above the expected attrition rate without vapor-recovery.

With a competitive cost pass-through of the balance system, a net additional 10,546 stations would be closed after vapor-recovery which represents 6% of the 1977 service station population. As shown in Table 12, the service station population in 1981 will range from 127,000 to 139,000 after attrition from market rationalization factors as well as both "capital" and "profitability" closures resulting from vapor-recovery. Vapor-recovery costs would then induce from 10,000 to 22,000 additional closures over and above the " normal" market attrition processes which are now underway.

The prime structural change in ownership patterns resulting from vapor-recovery will be a proportional as well as absolute reduction in the number of open dealers. Open dealers will bear the biggest impact of a vapor-recovery program as a result of their generally low gasoline volumes to cover the relatively high fixed costs of vapor-recovery and their inability to pass through much of these costs. Few lessee dealers supplied by majors would be closed only as a result of the added burden of vapor-recovery costs. The direct salary outlets of independents, closed after a national vapor-recovery program, would be primarily due to constraints in obtaining the capital for vapor-recovery investments. The impact of vapor-recovery on convenience stores would be relatively minor.

TABLE 11. SERVICE STATION CLOSURES (1977 to 1978) WITH VAPOR RECOVERY*

Type Station	Net Closures Based on Market Rationalization without Vapor Recovery	Additional Vapor Recovery Closures		Forecasted Closures Deducted from the 1977 Population
		Vapor Recovery-Inducted Closures Based on Capital Constraints	Vapor Recovery-Induced Closures Based on Inadequate Profitability/Loss	
Lessee	29672	0***	0***	29672
Direct - Major	1542	0***	0***	1542
Direct - Independent	5190	1210	0*	6400
Open Dealer	3122	4682	4421	12225
"C" Stores	(10400)**	- 0	233	(10167)**
Total	29126	5892	4654	39672

*Balance system with a cost passthrough.

**Net additions.

***Assumes stations in this group would have been closed, even without vapor-recovery.

TABLE 12. SERVICE STATION FORECAST (1981)

Type Station	Percent of 1977 Outlets	Percent of 1981 Outlets		
Type national vapor recovery	None	None	Balance*	Vacuum** assist
Vapor recovery competitive cost pass-through	NA	NA	yes	no
Lessee dealers	47%	36%	49%	42%
Direct salary - majors	6%	6%	6%	7%
Direct salary - independent	12%	11%	11%	12%
Open dealer	30%	34%	30%	25%
"C" stores	5%	13%	14%	14%
Total	100%	100%	100%	100%
Total Outlets Population	178400	149264	138700	127200

*Lowest impact case is the balance system with 100% pass-through of costs for the most efficient operator in each segment.

**Highest impact case is the vacuum-assist system with no cost pass-through for any station.

Depending upon the type system and the cost pass-through ability, the total cost* of vapor-recovery for the stations surviving in 1981 would range from $2.0 to $3.1 billion. This level of cost represents 75% to 78% of the total cost of vapor-recovery which would have been required to equip the entire 1977 service station population. Over an assumed 10-year project life, the average cost to the economy for a national vapor-recovery program to control benzene emissions in gasoline would then range from $.0022/gallon for balance systems to $.0033/gallon for a vacuum assist program.

A Stage I only control program is not expected to have a significant impact upon incremental service station closures above those closed by "normal" market factors without vapor recovery.

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*Total cost = investment plus financing plus 10 years of operating expenses.

II. NATIONAL AUDIT OF SERVICE STATIONS

A. PURPOSE

OSHA and the EPA are considering regulations which would limit benzene emissions at gasoline-dispensing facilities by use of vapor-recovery technology. In this analysis, it has been assumed that benzene emission control would be a nationally mandated program with no exceptions allowed. To assess the economic impact of these regulations on the service station industry, this section identifies the population of retail gasoline outlets in each PAD District (Figure 1) in the United States by the following operational characteristics:

- Retail gasoline throughput,
- Type of retail gasoline operations, and
- "Ownership" or outlet control.

B. AUDIT SUMMARY

Over the last five years, the service station industry has undergone a period of market rationalization during which time a large number of older and less profitable outlets have closed. The result has been a 21% drop in the service station population from a high of 226,000 in 1972 to 178,000 today.

During the same period, new methods of gasoline retailing have evolved in direct competition with conventional "mainline" service stations. These new competitors include: total self-service outlets, high-volume gas-n-go "filling stations", and "tie-in" operations, such as convenience stores and car washes. Some of the newer modes of retailing gasoline, such as convenience stores, may derive less than 50% of their income from gasoline sales. However, these outlets are included in an expanded definition of the service station population since they compete for volume with conventional

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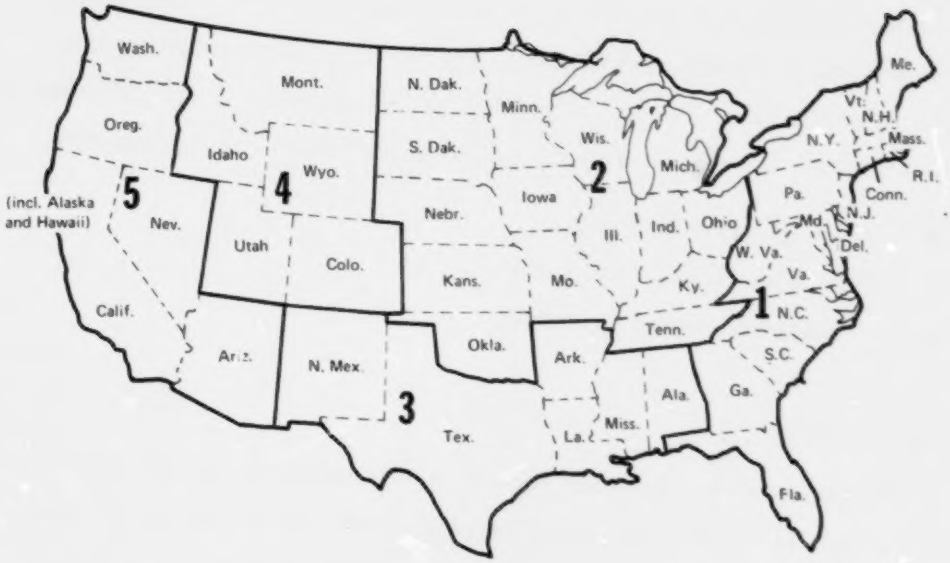

Figure 1. Petroleum Administration for Defense (PAD) Districts

service stations. The following gasoline-dispensing facilities are not included in this service station audit, but are reviewed in Task II of this report: farms, commercial/industrial operations, governmental or public utility garages, and miscellaneous retail outlets, such as marinas, general aviation facilities, and numerous rural general retailers with small gasoline sales volume (i.e., often called "Mom and Pop" stores).

As shown in Table 13, more than two-thirds (68%) of U.S. service stations are located in PAD Districts I and II, and approximately half (48%) of all outlets are supplied directly by major oil companies. Other classes of direct supplies include: regional refiners, large independent marketer/wholesalers (including the super jobbers), and small jobbers. PAD Districts III and V, with concentrated refining centers, have the highest percent of major supplied outlets. For example, 59% of outlets in PADD V (the West Coast) are supplied directly by majors, but only 34% of service stations are supplied directly by majors in PADD IV (Rocky Mountain States).

The average sales volume per outlet also varies by region with a low of 36,000 gal/mo for a typical service station in PADD III (a highly dispersed and rural market area) and a high of 46,000 gal/mo for a typical outlet in PADD V (an area of intense competition and a high degree of urbanization). (See Table 14.)

The penetration of self-serve outlets also varies by PAD District. Thirty-eight percent of total U.S. gasoline volume is currently pumped through self-serve pumps at total self-serve outlets or split-island operations (i.e., one pump island with self-serve sales and the other with attended full service). The average station throughputs in PADD's I and II are approximately equal to the national average, but less than a third of the volume is moved by self-serve

TABLE 13. U.S. SERVICE STATION POPULATION SUMMARY BY DIRECT SUPPLIER MID-YEAR 1977

	Direct Supplier						
	Major Oil Company*		Other(†)**		Total Population		
PADD	# Outlets	% District	# Outlets	% District	# Outlets	% District	% Total Outlets
I	28,360	47	31,480	53	59,840	100	34%
II	26,500	43	34,570	57	61,070	100	34%
III	14,020	52	12,880	48	26,900	100	15%
IV	2,170	34	4,200	66	6,370	100	3%
V	14,220	59	9,990	41	24,210	100	14%
Total USA	85,270	48	93,120	52	178,390	100	100%

Source: FEA, National Petroleum News, industry contacts, and Arthur D. Little estimates.

†Regional refiner/marketer, large independent marketer/wholesaler ("super jobber"), small jobber

*See Appendix A, Table 1

**See Appendix A, Table 2 for Regional Refinery listing.

TABLE 14. U.S. SERVICE STATIONS THROUGHPUT SUMMARY MID-YEAR 1977

PADD	Number of Outlets	Total Annual Throughput (mm/gal)	Average Monthly Throughput Per Outlet (000 gal)	Percent Throughput Dispensed by Self-Service
I	59,840	27,510.8	38	31%
II	61,070	29,219.2	40	31%
III	26,900	11,452.6	36	48%
IV	6,370	2,904.6	38	55%
V	24,210	13,324.8	46	56%
Total USA	178,390	84,412.0	39	38%

Source: FEA, Industry contacts, Lunberg Letter, and Arthur D. Little estimates.

pumps. PAD Districts III and IV have high self-serve penetration, but the average station throughput is less than the national average due to the low population density. PADD V has the highest self-serve penetration and a high density of demand resulting in an average outlet throughput which is well above the national average.

C. METHODOLOGY

The service station audit developed in this task is a synthesis of publicly available data from trade journals and government data, as well as proprietary information from various petroleum industry contacts and in-house knowledge at Arthur D. Little. Actual 1977 data on average volume, type of operation, and method of supply by state were obtained for approximately 60% of the major-supplied, major-branded outlets. The total number of jobbers* by state was obtained from NOJC** which was supplemented by sample surveys of state jobber associations to determine average jobber volumes and operational profiles. Private branded outlet data were provided by interviews with the majority of independent marketer/wholesalers and "super jobbers". An analysis of the convenience store industry was also based on oil industry contacts, convenience store trade publications and conversations with convenience store trade groups. All of these industry inputs were then folded into our audit which was checked by public data on total outlets (e.g., NPN Fact Book and Census of Retail Trade).

The penetration of the self-serve mode of retailing into gasoline marketing was evaluated, based upon recent industry studies as well as data from industry trade publications.

D. TOTAL U.S. SERVICE STATION MARKET

By mid-year of 1977, gasoline consumption in the United States was approximately 7.3 million bbl/day (i.e., 109 billion gal/yr) which represents a 2.5% growth over the same period in 1976. Approximately 75% of this volume moved through retail service stations with the balance sold to governmental, industrial, and commercial consumers, or to small "non-conventional" retail outlets (e.g., marinas, "Mom and Pop" stores, etc.). In addition to the 178,000 service stations in the United States, there are approximately 243,000 "non-service station" dispensing locations, as discussed in Chapter III.

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*National Oil Jobbers Council - A Jobber Trade Association.

**A jobber is a petroleum distributor who purchases refined product from a refiner or terminal operator for the purpose of reselling to retail outlets and commercial accounts or reselling through his own retail outlets.

Direct gasoline suppliers to retail service stations can be divided into four groups:

- major oil companies,
- regional refiner/marketers,
- independent marketer/wholesalers - "super jobbers", and
- small jobbers.

In this analysis, the 17 largest oil companies are defined as majors, which are fully-integrated* and market gasoline in 21 or more states (see Appendix I, Table 1). The next 21 largest oil companies are considered to be regional refiner/marketers which tend to be partially integrated, but operate at least one refinery and generally market gasoline in less than 21 states (see Appendix I, Table 2). The independent marketer/wholesaler group, including gasoline-oriented "super jobbers", are also multi-state retailers but lack their own refining capability. These companies tend to market under their own private brand, but may also be involved as branded jobbers. Approximately 270 gasoline "super jobbers" and independent marketer/wholesalers operate in the United States with an average of 80 service stations in their directly controlled retail chain. Also included in this large independent category are approximately 25 large-chain convenience store retailers with gasoline operations. The last direct supplier category is the small jobber which generally markets gasoline under major oil company brands through 6 to 12 service stations within a single state. There are approximately 9,000 small gasoline jobbers in the United States which deliver to almost 48,000 service stations.

A summary of the U.S. service station population by direct supplier and type of operation in various throughput ranges is presented in Table 15.

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*Engaged in all phases of the oil business (viz., exploration, production, refining, supply and transportation, and marketing).

TABLE 15. SUMMARY OF SERVICE STATION AUDIT

THROUGHPUT (000 gal/mo)	% OF TOTAL OUTLETS					% Total	Total
	≤10	11-24	25-49	50-99	>100		
DIRECT SUPPLIER MAJOR							
Direct	0.4	0.1	0.9	1.4	0.8	3.6	6,320
"C" Store	-	0.4	-	-	-	0.4	800
Lessee	2.3	14.9	6.6	4.0	0.4	28.2	50,260
Open	-	9.0	5.7	0.9	-	15.6	27,890
SUBTOTAL	2.7%	24.4%	13.2%	6.3%	1.2%	47.8	85,270
REGIONAL REFINER							
Direct	-	0.1	0.5	1.1	0.6	2.3	4,010
"C" Store	-	0.1	-	-	-	0.1	200
Lessee	0.6	1.3	1.9	1.3	0.2	5.3	9,420
Open	-	0.4	0.6	0.1	-	1.1	2,030
SUBTOTAL	0.6%	1.9%	3.0%	2.5%	0.8%	8.8	15,660
INDEP. MARKETER/WHOLESALER "SUPER JOBBER"							
Direct	-	0.3	1.1	5.5	2.4	9.3	16,630
"C" Store	-	4.3	-	-	-	4.3	7,560
Lessee	0.2	0.6	0.8	0.6	0.3	2.5	4,510
Open	-	0.4	0.1	0.1	-	0.6	1,100
SUBTOTAL	0.2%	5.6%	2.0%	6.2%	2.7%	16.7	29,800
SMALL JOBBER							
Direct	-	0.5	1.0	1.1	0.2	2.8	5,110
"C" Store	-	0.6	-	-	-	0.6	1,040
Lessee	0.6	4.3	4.7	1.4	-	10.9	19,500
Open	0.4	3.4	7.3	1.2	-	12.3	22,010
SUBTOTAL	1.0%	8.8%	13.0%	3.7%	0.2%	26.7	47,660
% Total Outlets	4.5%	40.7%	31.2%	18.7%	4.9%	100%	
Total No. Outlets	8,100	72,650	55,740	33,270	8,630		178,390
% Total Annual Volume	1%	22%	30%	33%	14%	100%	
Total Annual Volume (MM gal/yr)	777.6	18,602.4	24,748.5	28,252.8	12,030.7		84,412.0

a) Direct: Company-controlled/company-operated
"C" STORES: Convenience stores
Lessee: Company-controlled/dealer-operated
Open: Dealer-controlled/dealer-operated

Source: FEA, Natural Petroleum News, Progressive Grocer, Convenience Store Magazine, Industry contacts.

Details of this audit are presented by PADD in Appendix B (Throughput Analysis) and Appendix C (Control/Operations Profile). Almost 75% of retail gasoline outlets have throughputs of less than 50,000 gal/mo with the national average volume equal to approximately 39,000 gal/mo. Eighty-four percent of major-supplied outlets have sales of less than 50,000 gal/mo and half of these major outlets are in the 11,000- 24,000 gal/mo group.

In total, stations with sales less than 24,000 gal/mo represent 45% of the outlets, but only 23% of the volume. Conversely, high-volume stations pumping more than 100,000 gal/mo equal only 10% of the total outlets, but account for 14% of the retail gasoline volume.

Two-thirds of the regional refiner/marketer outlets pump from 25,000-99,000 gal/mo with an average of 56,000 gal/mo. Independent marketer/wholesaler "super jobber" stations include convenience stores in the 11,000-24,000-gal/mo category (averaging 22,000 gal/mo) and high-volume pumpers averaging 90,000 gal/mo. The high-volume outlets are mostly direct operations which are controlled and operated by the supplier. Small jobber-supplied stations fall mostly into the 25,000-49,000 gal/mo range. Over a third of the small jobber-supplied outlets pump less than 25,000 gal/mo and contain many low-volume, lessee dealer outlets. Small jobbers also supply almost as many open dealer outlets as the major oil companies.

E. U.S SERVICE STATION OWNERSHIP PATTERNS

Service stations in the United States can broadly be classified into the following four operational groups:

- Direct outlets (supplier-"controlled"/supplier-operated),
- Convenience stores ("C" stores),
- Lessee dealers (supplier-"controlled"/lessee dealer), and
- Open dealers (dealer-"controlled"/dealer-operated).

The word "controlled" is used to describe the above service station operations because the supplying company or dealer may, or may not, actually have title to the real estate and the fixed assets at the service station site. A private financial investor may own the property as a real estate investment and lease it to the supplier or dealer on a long-term contract. Both in this situation and in the case of direct ownership of the land, the supplier or dealer, in effect, controls the site in the long to medium term (i.e., a 10- to 15-year period). Direct outlets are controlled by the gasoline supplier and operated by direct oil company employees (including commission arrangements). For major oil companies, direct operations include high-volume sites and large investment "tie in" operations (e.g., diagnostic car care centers or large car wash operations) as well as new total self-serve outlets. As shown in Table 15, almost all outlets pumping greater than 100,000 gal/mo are direct supplier operations, 60% of which are run by "super jobbers"*. Currently, direct outlets represent 32,000 service stations or 18 percent of total U.S. outlets. The proportion of direct outlets is expected to grow in the future at the expense of lessee dealer and open dealer outlets. More than half of the independent marketer/wholesaler-super jobber outlets are directly operated. Direct salary operations represent 26% of the regional refiner outlets, but only 7% of stations directly supplied by major oil companies (see Table 16).

Convenience stores pumping gasoline are controlled and operated by either large convenience store chains, major oil companies, regional refiners, or "super jobbers". Many small jobber-supplied "C" store operations are a hybrid arrangement of a direct operation and an open dealer. An independent food retailer runs the inside operation (i.e., food, etc.) and receives a fixed commission for all gasoline sales to compensate for labor and services. Convenience stores have grown rapidly in the last few years and represent

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*Including independent marketer/wholesalers.

TABLE 16. US SERVICE STATION CONTROL BY TYPE OPERATION

Direct Supplier	% of Total Outlets			
	Direct Outlets*	Convenience Stores	Lessee Dealer**	Open Dealer*†
Major Oil Company	7	1	59	33
Regional Refiner	26	1	60	13
Independent Marketer/"Super Jobber"	56	25	15	4
Small Jobber	11	2	41	46
Total All Suppliers	18%	5%	47%	30%
Total Number of Outlets	32070	9600	83690	53030

*Company "controlled"/company operated
**Company "controlled"/lessee dealer
†Dealer "controlled"/dealer operated

Source: FEA, industry contacts, "Progressive Grocers," and Arthur D. Little estimates.

aggressive gasoline competitors. There are approximately 30,000 "C" stores in the nation, with almost 33% now marketing gasoline (i.e., 9,600). Large "C" store chains run 71% of the gasoline-selling convenience stores. Other current "C" store operators include:

Marketer	Percent of Total "C" Stores
• Majors/Regional Refiner	11
• "Super jobbers"	8
• Small jobbers	11

The "C" store population marketing gasoline is expected to grow to more than 20,000 locations by 1980. Despite their low average gallonage (22,000 gal/mo), self-serve "C" stores can price gasoline at a level competitive with high-volume, self-serve pumpers as a result of very low labor and overhead costs. Lessee dealer stations are run by an "independent" dealer who "rents" the facility from his gasoline supplier who has the long-term controlling interest in the station. The dealer is not an oil company employee and is responsible for his own investment, expenses, and profitability. Such stations are typically two- or three-bay facilities where more than one half of the dealers' sales realization is derived from products and services other than gasoline (e.g., tires, batteries, accessories, inside mechanical work, etc.). Lessee dealer stations represent 47% of total retail gasoline outlets in the United States (840,000 stations). Major oil companies control almost 60% of total lessee dealer operations. Other lessee dealer suppliers include:

Supplier	Percent Lessee Dealers
● Small jobbers	23
● Regional refiners	11
● Super jobbers - IM/W*	5

An open dealer station is an operation where the on-site dealer is also the "owner" of the facilities. The open operator is not permanently tied to any particular brand, but "flies the flag" of the supplier from which he can extract the best deal. Outlets involved in an arrangement known as lease/leaseback are also included in this group. This variation of an open dealer describes a situation where the dealer controls the site, but leases it to a supplier for a given rent per gallon (e.g., \$0.0200/gal) and leases it back from the same supplier for a lesser amount (e.g., \$0.150/gal). This, in effect, is a way of increasing the cash flow of the open operator. Very few of these types of arrangements have survived over the last few years. Compared to the other types of service station operations, open dealer outlets tend to be older and more depreciated. Open-dealer sites represent 30% of the total stations in the country, but have less than the national average sales volume per outlet. The direct source of supply to open dealers includes:

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*Independent marketer/wholesalers

Supplier	Percent Open Dealers
• Majors	53
• Small jobbers	41
• Regional refiner	4
• Super jobber - IM/W*	2

As shown above, the majority of open dealers tend to operate with a major oil company brand. The vast majority of open dealers operate neighborhood service stations in rural and/or suburban areas.

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*Independent marketer/wholesalers.

III. AUDIT OF "PRIVATE" GASOLINE-DISPENSING FACILITIES (1977)

A. SUMMARY

The purpose of the audit of the "private" gasoline-dispensing facilities was to identify the total number of facilities other than conventional service stations which dispense gasoline. These outlets could be liable for vapor-recovery controls both to reduce the potential toxic exposure of benzene to employees and to lower overall hydrocarbon emissions.

The number and geographical distribution of "private station" gasoline facilities in the United States closely follows the pattern of service stations. "Private" gasoline-dispensing facilities are maintained by governmental, commercial, or industrial consumers for their own fleet operations. Miscellaneous retail outlets not classified as service stations include marinas, parking garages, and rural "Mom and Pop" businesses which sell gasoline as a convenience to their customers rather than as a major source of income. As of June 1977, there were approximately 243,000 "private" locations in the country. However, only 1% of these facilities dispense more than 20,000 gal/mo. The number of retail service stations in the United States is approximately 178,000. The largest concentration of both private and retail gasoline outlets is located on the East Coast and in the Midwest with a propoportional amount of both types of facilities in each Petroleum Administration for Defense District (PADD). "Private" gasoline outlets represent 58% of the total gasoline outlets in the country, but only 23% of national gasoline volume dispensed.

As a benchmark for the EPA, an analysis was made of the non-retail gasoline-dispensing facilities in six sample Air Quality Control Regions

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(AQCR)*. The AQCR's with the largest population and associated service industries naturally have the largest number of total gasoline-dispensing outlets. This work updates gasoline-dispensing data for four AQCR's previously obtained by Arthur D. Little for the EPA. The objective of the AQCR's segregated analysis was to highlight the gasoline-dispensing mix in key metropolitan areas which may proportionately differ from regional and national statistics.

B. METHODOLOGY

The prime data source for the trucking and private service industry was the 1972 Bureau of Census "truck use inventory" computer tape. Gasoline-powered trucks were aggregated by fleet size, which is the relevant variable for the identification of dispensing outlets. This survey was updated by Arthur D. Little estimates to match the 1977 consumption of gasoline by these truck sectors. Public service and utility vehicles in the truck tape were segregated and assigned to a separate user category. Agricultural outlets were estimated from the 1977 gasoline consumption per acre by state, and fleet size information was derived from the Bureau of Census truck tape.

Federal Government gasoline consumption data were obtained from highway statistical data of the Department of Transportation and an FEA survey of federal agency gasoline consumption. Military gasoline consumption data by location were obtained directly from the Department of Defense. The number of outlets and consumption levels for the state, county, and municipal fleets were obtained initially from a survey of public vehicle registrations, as well as from gasoline consumption estimates by state. This number was then further reviewed through telephone surveys with various local government agencies and municipal transportation publications. The number of gasoline outlets and total gasoline consumption of the utility industry were derived from the truck tape and allocated according to the county business patterns of the U.S. Bureau of Census and electric utility trade statistics.

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*Boston, Baltimore, Denver, Los Angeles, Dallas, and Chicago

Estimates for taxi cabs, school and city buses, and rental agencies came from industry sources and trade publications. The number of miscellaneous retail outlets -- marinas, "Mom and Pop" stores, etc. -- were estimated both from the Department of Transportation 1977 estimate of off-highway fuel consumption, by U.S. Bureau of Census statistics of retail units, and by in-house data. At AQCR and PADD levels, the distribution of dispensing facilities used was derived from county business patterns of the U.S. Bureau of Census.

C. REGIONAL DISTRIBUTION

In this analysis, the number of private gasoline locations was divided into two groups: (1) Facilities with throughput equal to or greater than 20,000 gal/mo, and (2) those outlets dispensing less than 20,000 gal/mo. This division was used to highlight the very high-volume, gasoline-consuming segments of industry, commerce, and the Government.

A geographical analysis was made on a PADD basis for the United States. As a benchmark, the four sample AQCR's reviewed in our previous Stage II analysis for the EPA were updated (viz., Baltimore, Boston, Denver, and Los Angeles), and the "private" gasoline outlets in two additional sample AQCR's (viz., Dallas and Chicago) were evaluated to yield at least one sample AQCR in each of the PADD areas. The largest number of these gasoline outlets are operated by the Government and various utilities. As shown in Table 17, these sectors contain 39% of the total number of "private" gasoline-dispensing facilities. The largest gasoline-consuming outlets are: military installations, followed by the postal service, large Government fleets, and major utilities (particularly telephone/communication companies which tend to utilize twice the gasoline volume of gas and electric utilities with a similar

TABLE 17. AUDIT OF "PRIVATE" GASOLINE OUTLETS
(gal/mo gasoline -- Total United States)

Sector	Number of Locations		Total Outlets	≥20M gal/mo Outlets as % of Total	% Total "Private" Gasoline Outlets
(Trucking/ Agriculture	<20M gal/mo	≥20M gal/mo			
PAD I	10,470	40	10,510	0.3%	
PAD II	16,550	100	16,650	1%	
PAD III	16,280	110	16,390	1%	
PAD IV	2,890	20	2,910	1%	
PAD V	7,990	50	8,040	1%	
Sub-total	54,180	320	54,500	1%	23%
Utilities/Government (including Military)					
PAD I	37,070	680	37,750	2%	
PAD II	29,380	500	29,880	2%	
PAD III	9,740	180	9,920	2%	
PAD IV	1,960	40	2,000	2%	
PAD V	15,170	290	15,460	2%	
Sub-total	93,320	1690	95,010	2%	39%
Other*					
PAD I	32,220	260	32,480	1%	
PAD II	29,140	170	29,310	1%	
PAD III	14,200	100	14,300	1%	
PAD IV	5,170	60	5,230	1%	
PAD V	11,960	140	12,100	1%	
Sub-total	92,690	730	93,420	1%	38%
TOTAL	240,190	2,740	242,930	1.1%	100%

*Buses, taxis, rental cars, new car dealers, and miscellaneous fleet vehicles, and miscellaneous retail outlets.

Source: FEA; Federal Highway Administration "Highway Statistics"; Department of Agriculture, Economic Research Service; Department of Defense, Automotive Fleet Fact Book.

number of employees). These sectors are large in absolute terms and include a multitude of Government outlets at the municipal, county, state, and federal levels, as well as both private and public utilities.

In the sample AQCR's, the trucking and service sectors typically have the largest absolute number of outlets and the greatest number of facilities dispensing greater than 20,000 gal/mo (see Table 18). The metropolitan areas have relatively fewer Government/utility outlets, since fueling requirements of these sectors are often pooled into central garages in such areas. These urban areas also have proportionately fewer miscellaneous retail outlets than in the national audit, since the "Mom and Pop" stores are predominantly a rural phenomenon. The trucking sector encompasses a wide variety of private service and delivery vehicles which tend to have a greater concentration in the metropolitan areas. Thus, the proportion of outlets in various sectors differs in the total United States and in the sample AQCR audits. On a nation-wide basis, the absolute number of large gasoline volume facilities in the trucking group is smaller than the total in either of the other two categories, since few farm accounts dispense more than 20,000 gal/mo.

Based on this survey, it is estimated that only 1% of the "private" gasoline facilities dispense more than 20,000 gal/mo (i.e., approximately 2,700 locations). The distribution of these outlets in the metropolitan AQCR's ranges from 1% of total facilities in Denver to almost 6% in the Boston region (see Appendix D for sample AQCR details). Large-volume "private" outlets in Chicago, Los Angeles, and Baltimore represent approximately 3% of the total gasoline-dispensing facilities in these AQCR's. In Dallas/Fort Worth, 2% of the total non-retail outlets are in the large consumer group.

TABLE 18. AUDIT OF "PRIVATE" GASOLINE OUTLETS - SIX AQCR'S
(Baltimore, Boston, Denver, Chicago, Dallas, Los Angeles)

Average Monthly Volume	Number of Outlets <20,000	>20,000	Total Outlets	% of Total Outlets
Trucking/ Agriculture	8,990	190	9,180	63%
Utilities/Government	3,000	110	3,110	21%
Other*	2,210	150	2,360	16%
Total	14,200	450	14,650	100%

*Buses, taxis, rental cars, new car dealers, miscellaneous fleet vehicles.

TOTAL NON-SERVICE STATION OUTLETS

Los Angeles	6,080
Denver	1,710
Boston	1,240
Baltimore	1,120
Dallas	1,950
Chicago	2,550
Total	14,650

Source: Federal Highway Administration: Highway Statistics; County Business Patterns; Department of Commerce, Bureau of Census; Local and State Agencies.

The large gasoline-dispensing facilities are thus concentrated in the following key consuming segments:

- utilities,
- large Government facilities,
- large metropolitan gasoline-fueled, short-haul fleets (e.g., newspaper delivery, etc.),
- taxicabs, and
- large automobile rental agencies.

The results of this volumetric segmentation implies that the enforcement problem may be simplified by concentrating only on the 20,000-gal/mo segments, if vapor-recovery systems are required. It would be exceedingly difficult to identify and monitor compliance by the myriad of the smaller volume gasoline consumers (i.e., those using less than 20,000 gal/mo), should vapor recovery be chosen as the control strategy for this group.

As shown in Table 19, there are approximately 243,000 "private" gasoline-dispensing outlets in the country which is one and one-third times the number of conventional service stations. The dispersion of both retail and non-retail outlets are proportional in each PADD. These non-service station outlets represent 58% of the gasoline facilities, but dispense only 23% of the gasoline volume sold in the United States (see Table 20). Thus, retail service stations, on average, will have more than four times the throughput of the non-service station gasoline outlets.

D. PRIVATE GASOLINE-DISPENSING SEGMENTS

1. Trucking/Service/Agricultural Sectors

The trucking sector includes all non-Government gasoline-powered vehicles used in wholesale/retail delivery operations, as well as miscellaneous services, construction, manufacturing, and extractive industries. This segment consumes approximately 8% of the total gasoline in the country as shown in Table 20. Typically, companies in this group with larger truck fleets will have their own on-site dispensing facilities. Approximately 75% of

TABLE 19. TOTAL GASOLINE FACILITIES BY PADD

	Number of Locations		Total "Private" Gasoline Outlets	% of Total "Private" Stations	Estimate of Serv. Stations	% of Total Serv. Stations
	<20M gal/mo	≥20M gal/mo				
PADD I	79,760	980	80,740	33%	59,840	34%
PADD II	75,070	770	75,840	31%	61,070	34%
PADD III	40,220	390	40,610	17%	26,900	15%
PADD IV	9,920	120	10,040	4%	6,370	3%
PADD V	35,120	480	35,600	15%	24,210	14%
Total USA	240,090	2,740	242,930	100%	178,390	100%
Total Volume (M Gal/year)	--	--	25,235	--	84,412	--
Av. Consumption Per Outlet (000 GAL/Mo.)			8.7		39.4	

Source: FEA; Federal Highway Administration "Highway Statistics"; Department of Agriculture, Economic Research Service; Department of Defense, Automotive Fleet Fact Book.

TABLE 20. ESTIMATED U.S. GASOLINE CONSUMPTION (1977)

End-Use Sector	Number of "Private" Gasoline-Dispensing Outlets	Annual Gasoline Consumption (Million Gal)	% Total U.S. Private Gasoline Volume	% Total U.S. Gasoline Volume
Agriculture	32,600	3,801.3	15%	3%
Trucking and local service	21,900	5,241.6	21%	5%
Government	85,450		11%	2%
- Federal		227.6	0.9%	
- Military		174.1	0.6%	
- Other*		2,266.4	9.0%	
Taxis	5,380	882.1	3%	0.8%
School Busses	3,070	144.7	1%	0.1%
Miscellaneous**	94,530	12,497.2	49%	11%
Total Non-Service Station Segment	242,930	25,235.0	100%	23%
Retail Service Station Segment	178,390	84,412.0	——	77%
All Segments --	421,320	109,647.0		100%

Source: Arthur D. Little estimates based on data from the following:

U.S. Department of Agriculture; Economic Research Service; Department of Defense, FEA, Automotive Fleet Fact Book.

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*State and municipal governments.

**Auto rental, utilities, and other.

the truck population is used primarily for intracity travel, and 86% of these vehicles are fueled by gasoline. Conversely, 87% of the travel outside of metropolitan areas is made by heavy-duty, diesel-powered trucks. There is a trend toward greater diesel use in even lighter and medium weight trucks. However, a dramatic fuel shift would require a phasing of up to five years for most fleets. A concentrated use of gasoline-powered trucks will most likely continue for intracity deliveries in the metropolitan areas. As shown in Table 18, more than 63% of the total non-retail gasoline facilities in the sample AQCR's are utilized for general trucking/service/agricultural fleet operations. However, only 2% of these outlets would use more than 20,000 gal/mo, despite the high total volume of gasoline used by this segment.

Individual companies, such as United Parcel Service (UPS), will more likely be affected by vapor-recovery controls to a greater degree than the total trucking industry. UPS, in particular, has approximately 1,078 gasoline facilities in the country and 7% of these locations consume more than 20,000 gal/mo. The breakdown of the trucking/agriculture sector are shown by PADD in Appendix E, Table 1.

Almost 75% of gasoline consumption by the agricultural sector is used in PADD II and III. In the total United States, approximately one-fourth of the non-retail gasoline consumption is used by agriculture. Gasoline, in turn, represents over 33% of the total fuel requirements of this crucial sector of the economy. The estimate of 36,000 outlets nationwide for agriculture represents those outlets which have relatively large size tanks (>1,000-gallon capacity) on the farm, and an average of three to five trucks per farm. This would include all major farms and irrigation sites, nurseries, and landscaping firms. Approximately 2.7 million farms in the United States are not included in this estimate as they would typically have small, above-ground tanks (e.g., 275-500 gallons) and would have a higher proportion of diesel-fired vehicles than of gasoline-powered equipment. In general, all agriculture outlets would use less than 10,000 gallons per month.

2. Government/Utilities Sector

Utilities have approximately 9,580 gasoline-dispensing facilities to service almost 640,000 trucks. The distribution of utility outlets is directly related to the service requirements of the surrounding population with the highest concentration in PADD's I and II. In the total trucking industry, the utility sector represents approximately 37% of the national gasoline-powered truck population. Utilities typically maintain central garages in the metropolitan areas with support facilities for suburban service vehicles. Roughly 1 percent of the utility gasoline facilities have consumptions exceeding 20,000 gallons per month.

Government agencies with central garages are typically regional locations for the postal service, Federal Government agencies, and state and county organizations. The central facilities typically dispense more than 10,000 gallons per month. Municipal outlets tend to have a greater degree of decentralization and throughputs of less than 10,000 gallons per month (e.g., fire, police stations, etc.). The consumption of gasoline at military bases is directly related to the size of the installation. In general, most of the major military facilities consume more than 20,000 gallons per month.

3. Other Miscellaneous Facilities

Approximately 90% of the taxi companies in the United States dispense their own gasoline (i.e., approximately 5,400 companies). The average throughput of these taxi facilities is a function of:

- the fleet size, and
- the average mileage per vehicle.

Two-hundred and ninety-five companies have fleets with more than 100 cabs which results in a gasoline consumption of approximately 20,000 gallons per month. In addition, 700 taxi companies consume between 10,000 and

20,000 gallons per month; 4,700 cab companies use less than the 10,000 gallons per month. The smallest cab companies (viz., those with a fleet of less than 10 vehicles) tend to have cooperative gasoline-dispensing arrangements, or have their cabs pick up fuel at a local service station.

Most school buses tend to be gasoline-powered. Approximately 4% of the 3,060 private school bus companies have their own gasoline pumps with consumption greater than 20,000 gallons of gasoline per month. In many cases, public school buses pick up their gasoline at a local municipal garage or at service stations. As in the case of taxi cab companies, school bus operations with greater than 10 buses would tend to have their own gasoline pumps. City and intercity buses for metropolitan transportation are predominantly diesel-powered. However, the service vehicles for these operations do use gasoline. Most of these transportation bus companies would generally consume less than 20,000 gallons of gasoline per month.

Of the 373,000 cars in fleets rented on a daily basis, about 25% are controlled by the three major rental agencies. The industry is gasoline-intensive, with the largest units in major cities and airports having volumes greater than 20,000 gallons per month. The truck rental sector was included in the trucking survey; typically, daily truck rental agencies do not dispense gasoline, but rely on service stations for supply.

Miscellaneous fleets - predominantly corporate fleets - are composed of 460,000 cars in fleets of more than 25 vehicles with complete or partial maintenance. An additional 1,318,000 cars are leased directly and 357,000 are salesman-owned. Approximately 288,000 locations have their own fleet pumps; less than 2% of these pump more than 20,000 gallons per month.

IV. RETAIL GASOLINE MARKETING ECONOMICS AND TRENDS

A. INTRODUCTION

The purpose of this chapter is to briefly define the current nature of the retail gasoline market, so that the base operational and economic conditions which will be impacted by vapor-recovery controls can be better understood.

This review of the retail gasoline industry includes a discussion of the following marketing elements:

- Retail gasoline marketing dynamics,
- Gasoline supply logistics,
- Gasoline retailer segments, and
- Current pro forma service station economics.

In addition, an assessment of the service station population outlook without vapor recovery has been made based upon trends in the market and discussions with various industry contacts.

B. GASOLINE MARKETING DYNAMICS

For more than a quarter of a century until about 1970, the production of both domestic and foreign crude oil contributed the most significant portion of total corporate profits to integrated oil companies. Defined roughly, the function of marketing was to create outlets to draw more barrels of crude oil and profits out of the ground. This volume-oriented philosophy tended to discourage innovative changes and efficiencies in petroleum marketing by the major oil companies. During this same period, consumer-oriented retailing changed dramatically to meet the needs of a growing mobile, suburban population. The neighborhood variety store was replaced by supermarket chains in the late 1950's, and this development was followed by the mushrooming of suburban shopping malls. During the 1960's, some dynamic independent gasoline marketers did attempt to attract the price-conscious buyers through high-volume/low-margin operations. Most of their sites were direct salary-operated stations which gradually evolved into self-service. However, most other petroleum marketers were slow to respond to these innovations. Over the last 30 years, great technological strides were made in exploration and production (e.g., offshore and deep wells), refining (e.g., larger, more complex refineries), and transportation (e.g., very large crude carriers, etc.). However, the marketing strategy of the majors remained relatively static during the 1960's, resulting in a gasoline retailing system by the early 1970's that had changed little in 20 years.

For almost 30 years the "name of the game" for petroleum marketing managers was sales volume with market share generally proportional to the share of retail outlets. Thus, the surest way to increase refinery runs and therefore upstream profits was to build or subsidize the construction of more branded retail outlets. The greater exposure of a given brand to the motorist, the more likely the chance for a sale, which is similar to the race for shelf space at supermarkets by food retailers. This market strategy in the oil industry, driven by production goals, resulted in a proliferation of service stations on seemingly every street corner with a high traffic count. The total number of service stations in the United States reached a peak in 1972 with more than 226,000 conventional outlets (excluding "Mom and Pop" retailers).

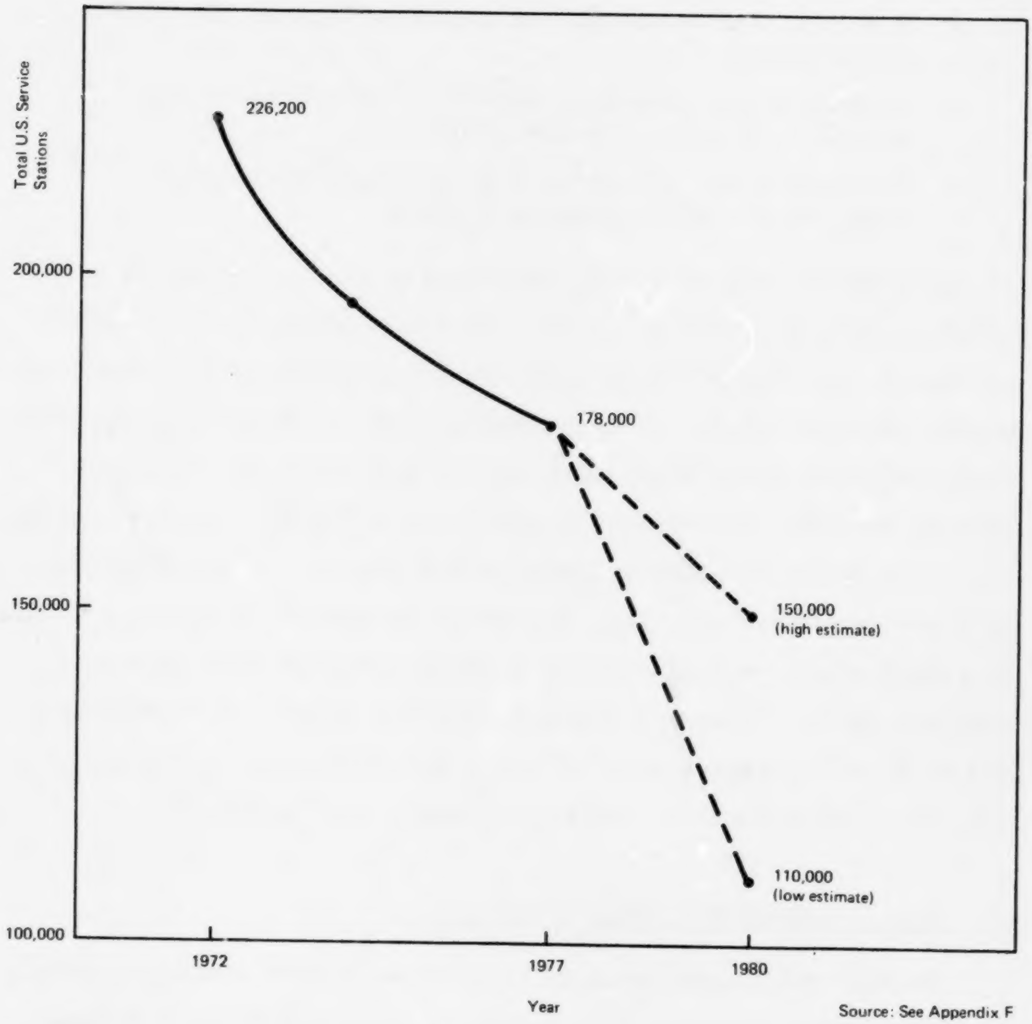
Gasoline marketing economics and resulting strategy began to change by the early 1970's and the changes were accelerated by the events preceding and surrounding the Arab Oil Embargo of 1973. Major changes in the environment included:

- Elimination of the crude oil depletion allowance;
- Increasing OPEC control of crude oil supplies and prices;
- The myriad of Government regulatory controls;
- Changes in the import quota system;
- A surplus of gasoline supply as demand growth rate fell dramatically;
- Increasing retail operating expenses and potential to realize economies of scale in gasoline marketing;
- Increased price competition from independent marketers who were able to realize economies of scale.

Integrated oil companies were then forced to view their marketing and/or refining operations as separate profit centers to be judged on "stand-alone" economics. No longer would marketing operations be subsidized by upstream profits. Many companies now even define individual outlets as separate profit centers whose economic justification must be self-sustaining. Such post-embargo strategies have directly or indirectly resulted in a closure of approximately 48,000 service stations in the last five years (i.e., 21% of the total 1972 service station population). The market rationalization process continues as a result of past petroleum marketing strategy when too many service stations were built. The service station population is expected to continue to decline by most industry sources down to a level of between 110,000 and 150,000 outlets by the early 1980's (see Figure 2 and Appendix F).

C. RETAIL GASOLINE SUPPLY LOGISTICS

The marketing of gasoline in the United States is quite complex. Virtually all of the gasoline consumed in the country is supplied by domestic refiners (viz., majors, regional refiner/marketers, and small independent refiners with no marketing activities).



Source: See Appendix F

Figure 2. U.S. Service Station Decline (1972 - 1980)

Gasoline is shipped from refineries by various modes of transportation to primary terminals operated by the refiners, large independent marketer/wholesalers, or independent liquid terminal operators. The distribution network and relevant pricing points are illustrated schematically in Figure 3. The product is sold at the terminal loading rack to one of the following classes of trade:

- Direct Sales - i.e., commercial/industrial accounts, retail outlets serviced directly or by consignees;
- Wholesale - i.e., large independent marketer/wholesalers (including "super jobbers") and small jobbers; these resellers may buy on either a branded or unbranded basis (i.e., for private brand resale) or both;
- Exchange - volumetric swap of product with another marketer who must provide an equal volume of product to the supplying company at another facility; no actual sales transaction is generally recorded.

Wholesale gasoline sales on a branded and unbranded basis are made effectively at the loading rack to both independent resellers (i.e., jobbers) and secondary brand subsidiary profit centers of a refiner/marketer. In some cases, arrangements are made for the fleet of the prime marketers (i.e., refiners or independent marketer/wholesalers) to deliver product to jobber outlets for a negotiated tariff. Both the prime marketers and jobbers then sell gasoline to commercial/industrial consumers as well as to various types of retail outlets. In some cases, especially in rural markets, a refiner may operate through a consignee who, in effect, is a commission agent paid for a distribution service on the basis of throughput. In such arrangements, title to the inventory and direct customer billing/receivables is retained by the prime marketer. All marketers (prime and jobbers) sell gasoline through one of the following four principal classes of branded or unbranded retail outlets:

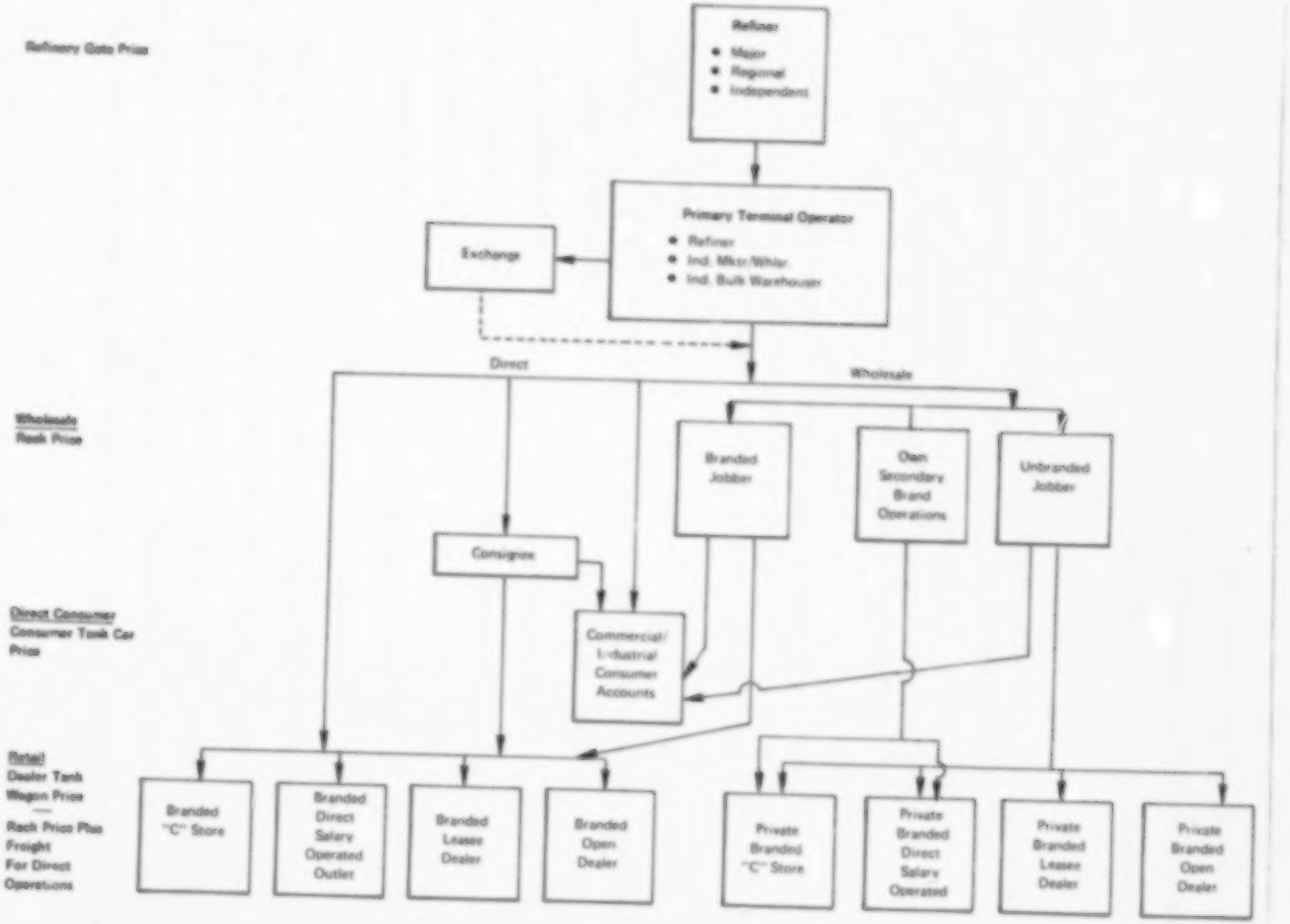


Figure 3. Gasoline Distribution Network

- Direct salary operations - supplier investment/supplier-operated with direct or commission employees;
- Lessee dealer - supplier investment/operated by a "independent" dealer who "rents" the facility and is contractually tied to the gasoline supplier;
- Open dealer - the investment at the outlet is "owned" by the onsite dealer operator;
- Convenience store - direct or open-account situation in which the gasoline operation is viewed as a separate profit center from other on-site retail activities (i.e, store food sales, etc.).

D. RETAIL GASOLINE MARKETING SEGMENTS

As identified in the Arthur D. Little service station audit, approximately 83% of the conventional retail outlets in the United States operate under a major and/or regional refiner brand (see Table 21). However, only 57% of the total is directly supplied by the refiners, and the balance are served by branded jobbers. Lessee dealers operating under various brands represent slightly under half of the total service stations in the country. Open dealers represent approximately one third of the total outlets, and are almost equally supplied by small jobbers and major oil companies. Direct salary operations represent 18% of the total service stations. More than half of the direct salary stations are operated by the large independent marketer/wholesalers and super jobbers.

E. CURRENT SERVICE STATION ECONOMICS

Continued closures of service stations are being driven by the contraction of retail margins fostered by economies of scale enjoyed by high-volume outlets and the labor-saving efficiencies of self-service/"C" store operations. In the long run, integrated marketers will require an adequate return on investment by individual service stations viewed as separate profit centers. The surviving gasoline retailers will generally be required to operate within

TABLE 21. U.S. SERVICE STATION
(% Total U.S. Outlets)

Direct Supplier	% OF TOTAL OUTLETS				
	Direct Outlets *	Convenience Stores	Leasee Dealer**	Open Dealer†	Total Directly Supplied
Major Oil Company	3.5	0.4	28.2	15.7	47.8%
Regional Refiner	2.3	0.1	5.3	1.1	8.8%
Independent Marketer/"Super Jobber"	9.3	4.3	2.5	0.6	16.7%
Small Jobber	2.9	0.6	10.9	12.3	26.7%
%Total Outlets	18.0%	5.4%	46.9%	29.7%	100.0%
Total Number of Outlets	32,070	9,600	83,690	53,030	178,390

* Company "investment"/company operated

** Company "investment"/leasee dealer

† Dealer "investment"/dealer operated

Source: Arthur D. Little Estimates (Table 3) a gasoline gross margin[*] spread from $0.025 to $0.050 per gallon, which is the current range of most high-volume stations. The gasoline margin at conventional service stations of lessee and open dealers will be forced to operate with gasoline gross margins of $.05 to $.06 per gallon. Thus, these neighborhood outlets must earn added revenue from TBA[**] sales in order to cover their total station expenses and make a profit. As shown in Table 22, the retail dealer gross margin has risen 22% since 1968, while the consumer price index increased 73%, an effective decrease of 26% in the real dealer gross margin. The FEA has estimated that "in order for the total margin to keep up with inflation, a price rise of 5.0 cents per gallon would be needed based upon market conditions of April 1977."[†] In the near term, it is unlikely that this level of price increase will take place in today's highly competitive market. As shown in Figure 4, high-volume stations with significant economies of scale will continue to be a prime competitive driving force of gasoline pump prices. Furthermore, the wholesale gasoline prices are relatively depressed at the present time due to excess refinery gasoline capacity with an estimated production of 7.2 million barrels per day[††] to meet a demand of only 6.9 million barrels[†††] per day.

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[*] The gross margin is equal to the difference between the composite pump price and the delivered price paid by retailers (i.e., the dealer tank wagon price)

[**] TBA - tires, batteries and accessories plus other miscellaneous "non-gasoline" sales.

[†] FEA, "Preliminary Findings and Views Concerning the Exemption of Motor Gasoline from the Mandatory Allocation and Price Regulations," August 1977.

[††] Petroleum Marketers Handbook, published by Oil Buyers Guide, 1977, pp. 76-99.

[†††] FEA Monthly Energy Review, September 1977, p. 10.

TABLE 22. COMPARISON OF RETAIL DEALER GROSS MARGIN FOR REGULAR GASOLINE TO THE CONSUMER PRICE INDEX (CPI)

Year	Retail Dealer Margin 1976 (¢/gal*)	CPI**	CPI Deflated Margin in 1968 (¢/gal)	Percent Increase From 1968		
				Retail Dealer Gross Margin	CPI	Deflated Gross Margin
1968	6.5	104.2	6.5	0	0	0
1969	6.7	109.8	6.4	3.1	5.4	(1.5)
1970	6.7	116.3	6.0	3.1	11.6	(7.8)
1971	7.1	121.3	6.1	9.2	16.4	(6.2)
1972	6.7	125.3	5.6	3.1	20.3	(13.8)
1973	7.4	133.1	5.8	13.8	27.7	(10.8)
1974	9.7	147.7	6.8	49.2	41.7	(4.6)
1975	8.4	161.2	5.4	29.2	54.7	(16.9)
1976	7.8	170.3	4.8	20.0	63.6	(26.2)
Jan.	7.9	175.3		21.5	68.2	
Feb.	7.9	177.1		21.5	70.0	
Mar.	7.8	178.2		20.0	71.0	
Apr.	8.1	179.6		24.6	72.4	
May	7.9	180.6		21.5	73.3	

* Platt's Oilgram and FEA-1968 to 1974;
Lundberg Survey, Inc. 1975

** Bureau of Labor Statistics

SOURCE: FEA, "Preliminary findings and views concerning the exemption of motor gasoline from the mandatory allocation and price regulations," August 1977.

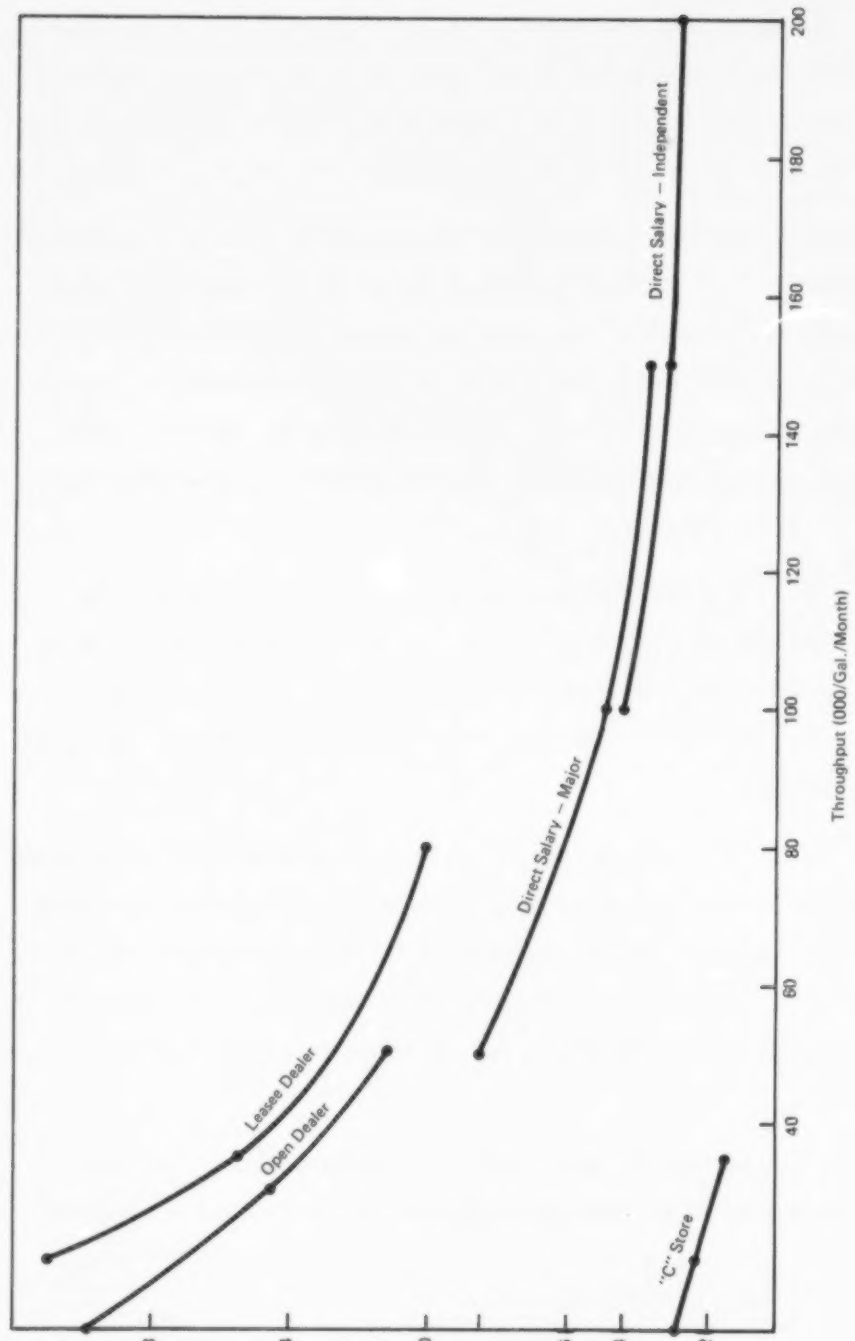

Figure 4. Service Station Operating Expenses

In the last 12 months, wholesale gasoline rack prices have dropped from $0.01 to $0.015 per gallon, but retail prices have fallen $0.02 to $0.03 per gallon, in spite of increasing operating expenses. Higher costs of operation cannot be directly added to the pump posting without losing volume, if competing outlets enjoy lower costs or refrain from passing through cost increases.

The highly competitive nature of the current gasoline market is somewhat reflected in the level of "banked costs"* of the largest 30 refiners. These costs represent added gasoline expenses which could have been legally recovered from the consumer under FEA price controls, but have not been passed on due to competitive constraints. As shown in Table 23, banked costs in 1977 have been in excess of $1 billion which is equal to approximately $.01 per gallon.

In summary, the retail gasoline market at the present time is a highly competitive business in a phase of long-term rationalization with shrinking net margins resulting in fewer outlets and operators. Thus, service stations will undoubtedly continue to close with or without the added burden of vapor-recovery investment.

Without a complete pass-through of vapor-recovery costs by all stations, a national vapor-recovery program will cut into the profitability of a highly competitive industry. A key consideration of the impact of vapor-recovery requirements is the degree to which these added absorbed costs will reduce gasoline margins below acceptable levels, precipitating additional station closures.

As a tool in assessing the impact of vapor-recovery costs, various types of service station prototype operations were constructed as separate

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*See Appendix G for a description of "banked costs".

TABLE 23. BANKED COST FOR TOP 30 REFINERS
($ million)

	No. 2 Distillate	Motor Gasoline	Aviation Jet Fuel*	Other Products	Total
1976					
Jan.	336	242	131	515	1,224
Feb.	279	336	145	456	1,216
Mar.	263	316	163	456	1,198
Apr.	237	398	180	424	1,239
June	N/A	628	135	349	1,112
July	N/A	587	129	384	1,100
Aug.	N/A	679	125	352	1,156
Sept.	N/A	619	134	340	1,093
Oct.	N/A	733	151	372	1,256
Nov.	N/A	796	168	368	1,332
Dec.	N/A	723	139	317	1,179
1977					
Jan.	N/A	901	166	325	1,392
Feb.	N/A	1,038	187	303	1,528
Mar.	N/A	956	180	287	1,423
Apr.**	N/A	1,017	202	305	1,524

N/A = not available since middle distillates were decontrolled on July 1, 1976.

* Prior to January 1976, refiners were not required to maintain separate banks for aviation jet fuel.

** Preliminary Figures

Source: FEA, "Preliminary Findings and Views Concerning the Exemption of Motor Gasoline from the Mandatory Allocation and price regulations," August 1977.

profit centers. Current margins for these prototype stations were based on the following assumptions:

- Gasoline gross margins were developed from data in industry trade journals in the summer of 1977 (e.g., Platt's Oilgram, Oil Buyer's Guide, Lundberg Letter, etc.). Average national composite prices for three grades of gasoline were either taken directly or developed for the following: (1) average pump posting (ex-tax); (2) dealer tank wagon prices; and (3) average wholesale rack price to resellers.
- Non-gasoline contribution margins and station operating costs were obtained from industry contacts and national service station accounting data from the first half of 1977.
- The pump postings of the service station prototypes attempt to reflect relative differentials between types of operations and volumes. However, all station prototypes are not necessarily assumed to be directly competing with each other. For example, a lease or open dealer in a rural or suburban neighborhood would mostly cater to the motoring needs of local residents. Such a station is most likely not in direct competition with a high-volume direct outlet in a dense traffic location with mostly transient, price-conscious customers.

Net margins for the various prototypes after vapor recovery were then determined based upon the following:

- The investment and operating expenses for the various vapor-recovery systems were provided by the EPA (as shown in Appendix H).
- The ability of any station to pass through vapor-recovery costs to the customers in the long run was limited to 100% of the vapor-recovery costs of the most efficient marketers in a given competitive environment. For simplicity, high-volume/low-cost and low-volume/high-cost segments were assumed.
- As agreed with the EPA, the cost impact of the aspirator-assist vapor-recovery system was not calculated, but was assumed to be somewhere between the cost of the balance and the vacuum-assist systems.
- A credit to to the service station profit center, for vapors recovered, returned to the gasoline storage tank and sold was supplied by the EPA (see Appendix I).

It is recognized that illustrative prototype operations cannot reflect all retail gasoline outlets in the country. Factors which introduce distinct regional variations from the illustrative national composite profiles include:

- The premium ratio differentials -- i.e., the proportional volume of premium, unleaded, and regular gasoline which varies in different parts of the country. Premium gasoline, of course, provides the highest gross margin to the dealer. For instance, premium gasoline represents roughly 40% of the throughput in California but only 20% on the Gulf Coast.
- The tires, batteries, and accessories (TBA) ratios also vary by region, affecting the non-gasoline contribution margin. Some markets may have a relatively limited TBA contribution as a result of competitive conditions from large mass merchandisers, such as national tire companies and discount chains. The sales of TBA per 1,000 gallons of gasoline may range from $250 in Denver to only $100 in Corpus Christi. These ratios are quite market specific, but generally higher in the Rocky Mountain and Midwest states and lower on the West and Gulf Coasts.
- Utility costs also vary between the Sunbelt and Northern states (e.g., $0.005 per gallon in Southern California and $0.0140 per gallon in Illinois for a 35,000 gallon per month station).
- The distance from both the refinery and terminal sources will affect the bridging and transportation costs and, as a result, the laid-in cost of gasoline. The movement of gasoline from the Gulf Coast to the Northeastern States by tanker in the fall of 1977 cost approximately $.023 per gallon versus $.013 per gallon by pipeline. However, not all shipments can be sent by the pipelines which are capacity constrained at this time.
- Refinery gate prices for gasoline may differ widely among companies for a variety of reasons, such as average crude costs, processing units, FEA regulations, refinery operating capacity, etc. Some industry contacts have indicated that this differential for gasoline among various refiners could be approximately $.03 per gallon.

Five types of prototype service stations were developed for this analysis, as shown in Table 24. A range of throughput volumes was estimated to show both reasonable upper and lower limit for the specific type of operation, as well as the average volume for the particular prototype. Supporting details for each prototype are provided in Appendix J.

TABLE 24. SERVICE STATION PROTOTYPE THROUGHPUT RANGES

Type Station	Direct Gasoline Supplier	Throughput Level (000 gal/mo.) Low	Medium	High
Leasee Dealer	Any Marketer	20	20	80†
Direct Operation	Major	50*	100*	150*
Direct Operation	Unbranded Independent	100*	150*	200*
Open Dealer	Any Marketer	10	30	50
"C" Store	Any Marketer	10*	20*	35*

† Split Island

* Self Service

Unmarked - Full Service

Source: Appendix J

Each service station is viewed as a separate profit center, and the total gross margins vary dramatically depending on the type of operation (Table 25). At the local neighborhood garage (e.g., a lessee or open dealer), typically half of the total gross margin of the station would come from sale of products and services other than gasoline. At self-service or high-volume outlets, gasoline essentially provides the only source of revenue. In our illustrative prototypes, gasoline also provides the only sales realization at "C" stores since the "inside" sales are considered to be part of a separate food operation profit center.

TABLE 25. TOTAL SERVICE STATION GROSS MARGIN ($/gal)

	Gross Margin ($/gal)			Gasoline Contribution To Total Gross Margin		
	Throughput Level*					
Type Station*	Low	Medium	High	Low	Medium	High
Lessee Dealer	0.1881	0.1601	0.1115	47%	49%	50%
Direct Operation - Major	0.0531	0.0521	0.0511	91%	92%	94%
Open Dealer	0.1831	0.1851	0.1311	56%	59%	54%
Direct Operation - Independent	0.0410	0.0390	0.0380	90%	95%	97%
"C" Store - Gasoline Only	0.0370	0.0370	0.0370	100%	100%	100%

Source: Appendix J

For the direct, independent, and "C" store operations, the cost of gasoline is based upon a rack price plus a truck transportation tariff (e.g., $0.4100 per gallon* plus $0.0075 per gallon freight). For all other stations, the laid-in cost of gasoline is tied to a destination-zone pricing system (i.e., a dealer tank wagon price* with a class of trade discount for the open dealer). The non-gasoline contribution margins (shown in the tables of Appendix G) represent the gross margin from the sales of tires, batteries, accessories, vending machine sales, etc. These TBA ratios represent averages based upon data from national statistics of a service station accounting firm. The elements of the TBA contribution margin are illustrated for a 35,000-gallon per month leasee dealer in Table 26.

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*Excluding tax.

TABLE 26. ILLUSTRATIVE NON-GASOLINE SALES CONTRIBUTION MARGIN

Item	TBA Ratio ($ sales/1000 gal of gasoline)
Tires	15.73
Oil	17.34
Batteries	5.07
Accessories	53.08
Lubes	3.51
Miscellaneous	12.26
Total Sales Realization	106.99
Total TBA Gross Margin (35%)	37.44
Labor* Contribution Margin	44.56
Total Non-Gasoline Contribution	82.00
Total $ for 35,000-gallon per month outlet	$2870/month
Unit Contribution Margin per Gallon of Gasoline Sold	$0.0820

*Revenue from "inside" mechanical work (e.g., tune ups, tire changes, etc.)

Source: Industry contracts and Arthur D. Little estimates.

The total onsite expenses of the prototype service stations are also a function of the type of operation (see Figure 4).

As shown in Table 27, service station operations are highly labor-intensive, especially for the conventional neighborhood garage operations typified by the open and lessee dealer prototypes. Self-service operations significantly reduce the absolute and per gallon labor operating expenses. With a high level of fixed

TABLE 27. SERVICE STATION OPERATING EXPENSES

Type Station/ Throughput Level	Total Expense* ($/gal.)			Labor* as a % of Total Expenses		
	Low	Medium	High	Low	Medium	High
Lessee Dealer	0.2086	0.1553	0.1050	60%	54%	50%
Direct - Major	0.0733	0.0499	0.0371	45%	40%	36%
Open Dealer	0.1999	0.1436	0.1134	69%	58%	57%
Direct - Independent	0.0443	0.0318	0.0294	41%	38%	37%
"C" Store	0.0290	0.0220	0.0137	12%	16%	26%

*Includes allocation for dealer salary, plus employee expenses.

Source: Appendix J

costs, economies of scale are significant with higher throughput volumes. The only exception to this is the labor portion of "C" store gasoline operation which is assumed to pay a constant commission per gallon to the food operation profit center. For the same volume of 35,000 gallons per month, the "C" store labor cost is equal to only 4% of the total labor cost of the lessee dealer. Also "C" store expenses represent only 9% of the total cost of the lessee dealer for the same illustrative volume.

The net margin for illustrative prototypes is equal to the difference between the gross margin (Table 25) and the operating expenses (Table 27).

In all of the prototypes except for the "C" store, the low-volume case results in a negative net margin after including depreciation and a dealer salary as expenses, but before income taxes (see Table 28).

TABLE 28. SERVICE STATION PROTOTYPES NET MARGIN SUMMARY ($/gal)

Type Station Throughput Level	Low	Medium	High
Lessee	(0.0205)	0.0048	0.0065⁺
Direct - Major	(0.0202)*	0.0022*	0.0140*
Open Dealer	(0.0165)	0.0145	0.0177
Direct - Independent	(0.0033)*	0.0072*	0.0086*
"C" Store	0.0080*	0.0150*	0.0233*

⁺Split Island
*Self Service

Source: Appendix J

F. SERVICE STATION POPULATION OUTLOOK WITHOUT VAPOR RECOVERY

The break-even volumes for the "typical" prototype stations are shown in Table 29. These were extrapolated from the volume/margin curves of Figure 5. Lessee and open dealers below the break-even point may, in fact, continue to operate in hopes of better times in the future. The net result of this action would be to effectively lower the take-home pay of a dealer who has little desire or opportunity for alternative employment. In the long run, direct supplier outlets operating at a loss or providing less than the corporate rate of return on investment or equity would be targets for closure, depending upon the alternative value of the site. Those sites remaining open would also be banking upon improved returns, based on a combination of higher throughputs in the future and possibly some improvements in margins due to changing market conditions for their own individual stations.

TABLE 29. BREAK-EVEN VOLUMES OF SERVICE STATION PROTOTYPES

Type Operation	Break-Even Volume (000 gal/month)
Leasee Dealer	28
Direct - Major	92
Open Dealer	15
Direct - Independent	108
"C" Store	6

Source: Figure 5

It is assumed that stations operating below the current break-even volume will, in the future, either remain open or be closed due to factors other than vapor-recovery investment requirements. Based upon the service station audit, there are more than 77,000 conventional service stations falling into the volume groups below the illustrative prototype break-even points (see Table 30). However, not all of these outlets will necessarily close since closure decisions will often be made based on a marginal cash flow analysis (i.e., depreciation and the dealer's own labor cost are not treated as expenses in a strict accounting sense). With a positive cash flow, many stations will remain open if the alternative use value of the site is relatively low.

Based upon discussions with industry contacts and trends noted in Appendix D, a subjective Arthur D. Little estimate of closures in various segments has been assumed which would result in a service station population of approximately 149,000 outlets in 1981 without a national vapor-recovery program (see Table 30). It is further assumed that a higher proportion of lessee and open dealer stations below break-even volumes will close than those having direct salary operations, due to the relative inability of the former to attract high-volume sales.

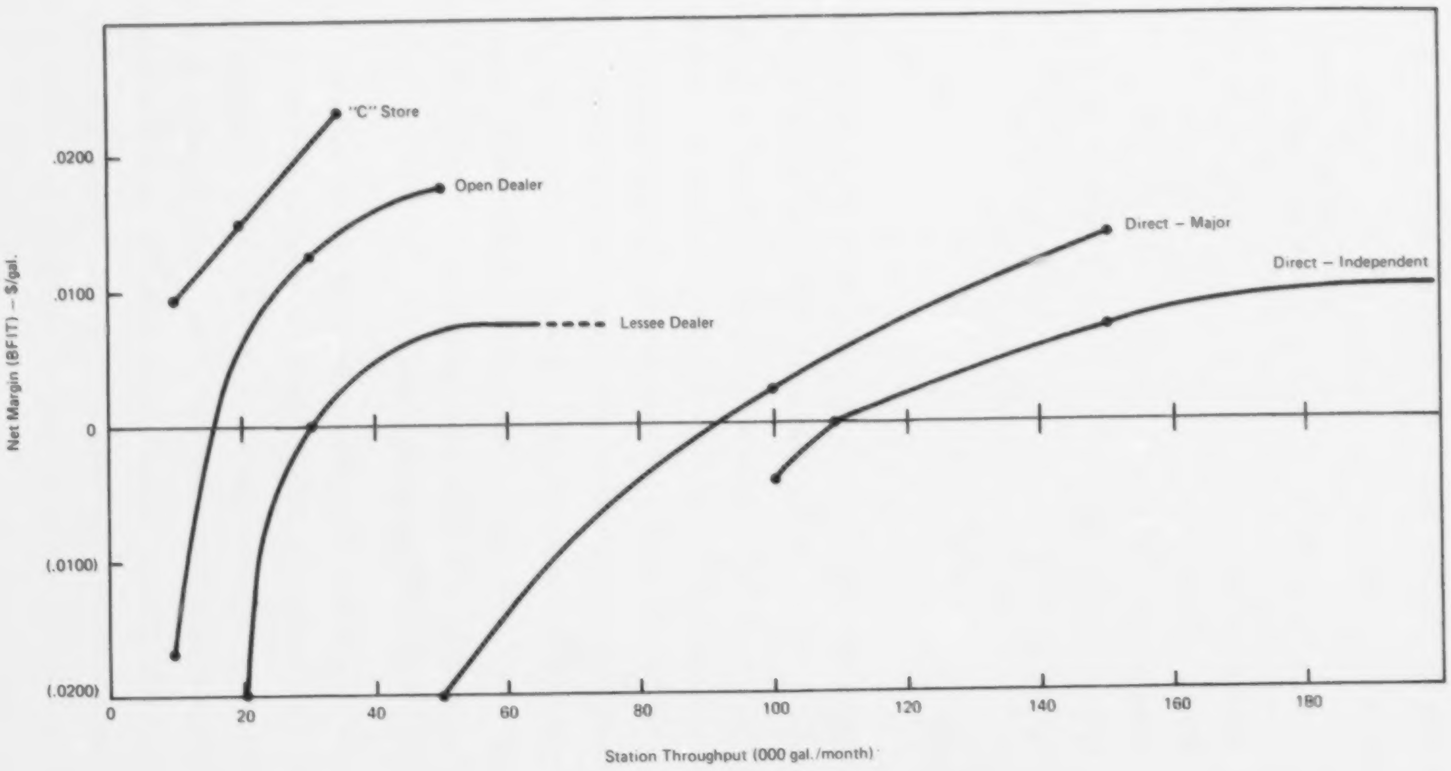

Figure 5. Break-Even Volumes for Typical Prototype Stations

TABLE 30. POTENTIAL SERVICE STATION CLOSURES BASED ON OUTLETS NOW OPERATING BELOW THE PROTOTYPE BREAK-EVEN POINT

(Pre Vapor Recovery)

Type Service Station Operation	Total No. of Stations (1977)	No. of Stations Currently Operating Below Prototype Break-Even Points	Estimated % of Closures of Below Prototype Break-Even Point Outlets	Total Number of Below Prototype Break-Even Point Closures
Lessee	83,690	44,957	66%	29,672
Direct - Majors	10,330	7,710	20%	1,542
Direct - Independent	21,740	17,301	30%	5,190
Open Dealers	53,030	7,804	40%	3,122
"C" Stores	9,600	–	–	(10,400)*
Total	178,390	77,772	19%	29,126

*Net gain in new "C" stores.

Source: Appendix F and Arthur D. Little estimates

As stations are closed, the throughput of the surviving outlets will on average increase. As shown in Table 31, the total average throughput for conventional stations in the country could grow approximately 33% from 1977 to 1981, assuming a 1.8%* gasoline growth rate per year. If this volumetric increase were applied equally to all stations, the surviving lessee and open dealer stations, which do not operate at below break-even point volumes, would cross the threshhold level for survival. However, it is most likely that direct salary stations would capture a disproportionately higher share of incremental gallonage as a result of superior positioning.

TABLE 31. ESTIMATED IMPACT OF SERVICE STATION ATTRITION

Year	Annual Gasoline Volume (MM gal)	No. of Service Station Outlets	Average Throughput (000 gal/month)
1977	84,412	178,390	39
1981	90,656	149,264	51

Source: Table 30 and Arthur D. Little estimates, based on FEA data.

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*Per the FEA's Gasoline Decontrol Preliminary Report, August 1977.

V. VAPOR-RECOVERY INVESTMENT REQUIREMENTS

A. INTRODUCTION AND SUMMARY

The purpose of this chapter is to define the level of capital expenditure required by retail marketers for vapor recovery, based on the current service station population. In addition, the various segments of gasoline suppliers to retail outlets are described. If no exemptions were allowed, vapor recovery for the control of benzene emissions would be required at over 178,000 service stations in the United States. As shown in Table 32, 60% of these outlets are controlled by independent marketers. Assuming no closures from the 1977 station population, the total investment for vapor recovery would range from $1.4 to $2.1 billion* (see Table 33). Details of this required expenditure by segment are shown in Appendix K, Tables I - V.

In general, both vapor-recovery operating expenses and investment are roughly proportional to the total number of service stations owned or controlled by each segment. The proportion of the total vapor-recovery investment is slightly higher than the percentage of outlets for the "super jobbers", since these companies tend to have more nozzles per station than most of the other groups. Conversely, open dealers tend to have smaller stations with fewer nozzles than most other types of outlets. The capital required for the balance vapor-recovery system is roughly 66% of the cost for the vacuum assist alternative. The aspirator-assist vapor-recovery system represents an intermediate cost alternative which is bounded by the balance and vacuum-assist systems. As agreed with the EPA, the calculations for the aspirator-assist vapor-recovery alternative have not been made, but are assumed to fall between the other two options.

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*Based on EPA cost estimates for Stage I (Tank Truck Offloading) plus Stage II (Vehicle Filling) vapor recovery.

TABLE 32. RETAIL OUTLET "CONTROL" AUDIT*

Sector "Controlling"* Outlets	Direct Outlets as a Percent of Total Sector Outlets	Lessee Outlets as a Percent of Total Sector Outlets	"C" Store Outlets as a Percent of Total Sector Outlets		Total Outlets
Major oil company	11%	88%	1%		57,380
Regional refiner	29%	69%	2%		13,630
Marketer/ Wholesaler- "super jobber"	58%	26%	16%		28,700
Small jobber	20%	76%	4%		25,650
Percent by Supplier	Major	Regional Refiner	"Super Jobber"	Small Jobber	
Open dealer	53%	4%	2%	41%	53,030
					178,390

Source: Table 15

*By either direct investment or long-term lease.

TABLE 33. NATIONAL VAPOR-RECOVERY CAPITAL REQUIREMENTS*

Item	Vapor Recovery Costs ($000)	Refiners		Independents		
	Total Units	Percent Majors	Percent Regional Refiners	Percent "Super Jobbers"	Percent Small Branded Jobbers	Percent Open Dealers
Service Stations	178,390	32	8	16	14	30
Stage I - Stage II Vapor-Recovery Investment						
• Balance System	1,373,385	32	8	19	14	27
• Vacuum Assist	2,114,841	32	8	18	14	28
Stage I + Stage II Operating Expense						
• Balance	91,696	31	8	21	15	25
• Vacuum Assist	118,895	30	8	21	14	27
Stage I Only Investment	255,729	20	9	18	17	36

*Assuming no closures from the 1977 service station population and excludes testing costs.

Sources: Table 15, Appendix H and Appendix K.

The total operating expenses for vapor recovery over 10 years for all current outlets would range from $92 to $119 million. Stage I systems would only capture vapors generated during the tank truck unloading operation. The total investment for Stage I would be only $225 million for all current outlets with virtually no associated on-site operating expenses.

B. TOTAL COSTS OF VAPOR RECOVERY

In addition to the original investment for the equipment and installation, the total annual cost for vapor recovery at service stations would also include the annual operating expenses over a 10-year life for the system, plus the financing cost for the required investment. The financing costs for capital from outside sources would differ for various segments of the industry and, in general, would be lower than an internal investment hurdle rate utilized by many integrated companies which have the lowest borrowing costs. External financing terms typically available to marketers able to obtain bank loans are shown in Table 34.

Assuming all current outlets were able to obtain bank loans, the total financing cost of vapor recovery with no closures would range from $473 million to $726 million (see Table 34).

Over the 10-year project life for vapor-recovery systems defined by the EPA, the total cost of vapor recovery to the economy ranges from $2.8 billion for the balance system and $4.0 billion for vacuum assist, as shown in Table 35. The unit cost of vapor recovery for the current service station population would range from $0.0030 to $0.0043 per gallon. A decreased number of outlets and/or increasing sales volume will lower these preliminary unit cost estimates (see Chapter VIII).

TABLE 34. SERVICE STATION POPULATION VAPOR-RECOVERY COSTS (1977)

Marketer Segment	Majors	Regional Refiners	Independent Marketer Wholesaler Super Jobbers	Small Jobbers	Open Dealer	Total
No. controlled stations	57,380	13,630	28,700	25,650	53,030	17,839
Financing time (years)	8	8	6	3	3	-
Interest rate	7.34%	8%	11%	12%	15%	-
Balance vapor-recovery investment ($000)	436,196	109,104	263,256	197,828	367,001	137,338
Balance financing costs ($000)	155,917	42,782	110,109	49,268	115,213	47,328
Vacuum-assist investment ($000)	676,088	165,588	376,383	304,744	592,038	211,484
Vacuum-assist financing costs ($000)	241,557	64,930	157,426	75,896	185,859	72,566

Source: Financial industry contacts and Arthur D. Little estimates.

TABLE 35. TOTAL VAPOR-RECOVERY COSTS**

Type System	($000)	
	Balance	Vacuum Assist
Investment	1,373,385	2,114,841
Financing Cost	473,289	725,668
Cumulative Operating Expenses (10 years)	916,960	1,188,950
Total Costs	2,763,634	4,029,454
Unit Cost* ($/gal)	$0.0030	0.0043

*Volume divisor = 932 billion gallons over 10 years
**Excludes system testing costs

Source: Table 34

C. VAPOR RECOVERY INVESTMENT -- INTEGRATED OIL COMPANIES

Major oil companies and regional refiners are the two marketing segments with the largest total corporate asset base. The scope of this report does not encompass an assessment of the capital acquisition ability of these two integrated sectors of the oil industry. The large integrated companies control 40% of the total retail outlets in the country through direct, lessee, and "C" store locations. According to the Economics Department of McGraw Hill Publishing Company, capital expenditure for the major oil companies and regional refiners is expected to be almost $30 billion in 1977, which represents a 2% increase over the previous year.* Almost 50% of this investment was consumed in the "upstream" end of the oil business in exploration and production. Only 4% of the total petroleum capital budget was used in the "downstream", marketing activities (i.e., $1.2 billion).

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*1977 NPN Fact Book, page 38.

Depending on the system, the capital required to comply with Stages I and II of the vapor-recovery program at existing outlets would range from 45% to 69% of the entire 1977 capital budget allocated for marketing activities. This level of investment represent 2% to 3% of the entire integrated petroleum industry capital budget for 1977. As shown in Table 36, a three-year, phase-in period for vapor recovery would lower the annual investment required for these systems to approximately 12% to 23% of the 1977 marketing capital expenditures. However, this level of investment may be somewhat overstated, since it is based on vapor-recovery installations in all current major controlled stations. As discussed in Chapter IV, some of these stations may close before any vapor-recovery decision is made.

As a further benchmark of vapor-recovery expenditure required by the major oil companies, the total capital investment by all phases of the oil industry for environmental effluent abatement was $803 million in 1977. Based upon API data,* it is estimated that the marketing portion of this environmental capital expenditure would be approximately $120 million. Thus, over a three-year period, vapor-recovery investments at existing stations would roughly double the total marketing capital expenditure for environmental controls by majors and regional refiners (see Table 37).

Source: *API publication No. 4259, Environmental Expenditures of the U.S. Petroleum Industry.

TABLE 36. INTEGRATED COMPANY CAPITAL REQUIREMENT FOR VAPOR RECOVERY

Type Vapor Recovery System	Vapor Recovery Investment** Required $Million	Vapro Recovery As Percent of the 1977 Marketing Capital Budget*	Annual Investment Over Three-year Phase In: Percent of the 1977 Marketing Capital Budget	Vapor-Recovery Investment as Percent of Total 1977 Integrated Company Capital Budget
Balance	545.3	45%	12%	2%
Vacuum Assist	841.7	69%	23%	3%
Stage I only	75.4	6%	2%	0.3%

*1977 NPN Fact Book, page 38.
**For majors plus regional refiners, assuming no closures.

TABLE 37. VAPOR-RECOVERY IMPACT ON CURRENT ENVIRONMENTAL CAPITAL BUDGET OF INTEGRATED OIL COMPANIES

Type Vapor-Recovery System	Vapor-Recovery Investment as Percent of 1977 Marketing Environmental Capital Costs	Annual Capital Outlay of a Three-year Vapor Recovery Program as Percent of 1977 Marketing Environmental Capital Costs	Vapor-Recovery Expenses as Percent of 1977 Marketing Environmental Operating Administrative Expenses
Balance	454%	151%	166%
Vacuum Assist	700%	234%	216%
Stage I only	63%	21%	0%

D. VAPOR-RECOVERY INVESTMENT - INDEPENDENT MARKETERS

Independent marketers control approximately 60% of the current service stations. If all of these outlets had vapor-recovery systems installed, this would require a capital outlay ranging from $828 to $1273 million.

Even with an eventual cost pass-through, independent marketers have told the EPA in recent submissions that many independents would not be able to obtain the necessary capital for vapor-recovery implementation. However, the affordability of vapor recovery and the credit worthiness of independent marketers are highly subjective issues and quite company specific. There are are some independents who are operating on a marginal basis, or even under a bankruptcy receivership. Such companies, in effect, may be stuck with an existing chain of outlets without a viable disinvestment option. The selling price for some outlets might not even cover the existing mortgages. In such cases, there would be few alternative uses for these sites. These marginal marketers may currently be stretched to the limit of their borrowing ability with all of their existing assets tied up as collateral on their current debt. Additional debt for vapor recovery could not generally be available without added liquid collateral. Vapor-recovery systems contain very few transferable tangible assets, and represent very poor collateral to most lenders (e.g., asphalt repavement, underground tank connections, etc.).

There are other independent marketers with a sufficient line of credit or retained earnings to meet the burden of vapor-recovery compliance. If necessary for corporate survival, a large chain operator might be forced to sell some outlets to obtain capital for vapor recovery at remaining sites. Depending on the location, some sites would have to be sold at a substantial discount from the current book value and/or mortgage balance. A number of independent marketers are wholly owned subsidiaries of corporations with assets and revenues from miscellaneous non-petroleum activities. These "independent" oil marketing subsidiaries could call upon the financial strength of the parent to meet their capital budget requirements. Some of the smaller independent marketers, such as open-dealers and small jobbers, could gain access to capital with personal loans from local banks. This would be expecially true if the retailers have good banking records and long-standing reputations in the community. Furthermore, some small independents might be fortunate enough to be operating in a relatively protected market as a result of local restrictive zoning regulations which may limit the opening of new service stations, including high-volume competitors and self-service outlets. Such an applicant would represent a much better risk than most retailers.

E. ILLUSTRATIVE INDEPENDENT MARKETER PROTOTYPES

The only sure method of determining the ability of independent marketers to obtain the necessary capital for vapor recovery would entail an exhaustive analysis of the private financial status of each independent marketer. In addition, an assessment of the off-balance sheet personal factors used by financing institutions for loan approvals (e.g., reputation of borrower, bank history, etc.) would have to be made. Since this level of effort is not realistic, corporate financial prototypes were developed to depict "typical operational profiles and pro forma financial statements for the following independent gasoline marketing segments:

- Independent marketer/wholesalers,
- "Super jobbers",
- Small branded jobbers, and
- Open dealers.

The purpose of these corporate prototypes is to:

1. Develop specific pro forma cases to test the ability of "typical" independent marketers to obtain the necessary capital for required vapor-recovery investments;
2. Indicate anticipated cost of capital and credit terms for financing vapor recovery investments by the various independent marketing segments; and
3. Illustrate a "typical" corporate marketing balance sheet and income statement before and after investment in vapor recovery.

An operational and financial summary of each of the four marketing prototypes is shown in Table 38 with supporting details in Appendix L (Tables 1 - 9).

The "typical" marketer prototypes basically describe four discrete levels of independent gasoline retailers. The largest prototype, large marketer/wholesalers, generally sell multiple product lines on both a direct and wholesale basis in several states. These organizations are generally integrated upstream into terminal and transportation operations. Furthermore, the large independent marketer/wholesaler sells both private and major brand gasoline to various types of service station operations. These marketer/wholesalers are generally regional in nature (i.e., within one PADD), with total sales volumes exceeding 10 MBD. It is estimated there are approximately 75 of these large independent marketer/wholesalers (e.g., Northeast Petroleum, Gibbs Oil, etc.). Most of these large marketers would belong to one or several of the following trade organizations:

- Society of Independent Gasoline Marketers of America (SIGMA),
- National Oil Jobbers Council (NOJC),
- Independent Fuel Oil Terminal Operators (IFOTO),
- Independent Liquid Terminal Association (ILTA), and
- Miscellaneous State or Regional Trade Groups (e.g., The New England Fuel Oil Institute, etc.).

TABLE 38. SUMMARY OF INDEPENDENT MARKETER PROTOTYPES

Market Segment	No. of Service Stations	Annual Volume (000 gal)	Percent Direct Gasoline Sales	Annual Sales Realization (Ex. Tax) ($000)	Net Worth ($000)	Net Worth Percent as of Total Sales
Large Marketer/ Wholesaler	160	249,000	53%	106,000	5,284	5%
Super Jobber	85	153,000	100%	69,967	5,377	8%
Small Branded Jobber	8	2,580	100%	1,134	205	18%
Open Dealer	1	300	100%	144	50	35%

Source: Appendix L

"Super-jobbers", the next level of independent marketers, are basically large-chain gasoline retailers with outlets in several states. The "super-jobber" retail outlets tends to be self-service and/or high-volume/low-margin operations. These companies essentially are rack buyers* with directly operated service stations representing most of their fixed assets. The majority of "super-jobbers" market gasoline under private brands, but may also operate some branded outlets. The average company in this second tier of independent gasoline retailers would typically control around 80 stations and would be a SIGMA member. There are approximately 200 of these gasoline-oriented "super-jobbers" in the United States (e.g., autotronics, checker, power test, etc.)

The third prototype attempts to simulate the operational and financial profile of a "typical" NOJC member. Such small jobbers tend to be branded marketers supplying 6 to 12 outlets which would include a few direct operations, open dealers, and lessee dealers. Small jobbers tend to operate outside of the large metropolitan markets and would be concentrated in a three- or four-county marketing area. These typically family-owned businesses may operate a small rural bulk plant and market gasoline and distillates to agricultural, retail, and commercial customers. However, jobbers would tend to specialize in either distillates or gasoline sales in the northern states. There are roughly 9,000 gasoline-oriented jobbers in the country.

Open dealer stations are also shown as dealer-owned/dealer-operated outlets. In these operations, an independent businessman owns or controls the assets of the service station and physically works on the site. Such a dealer would "fly the flag" of a supplier who has provided him with the best contractual arrangement. As shown in Table 39, open dealers are supplied primarily by major oil companies and small branded jobbers.

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*i.e, gasoline purchased under the loading rack into trucks at a supplier's terminal.

TABLE 39. OPEN DEALER AUDIT

Open Dealer Gasoline Supplier	Total U. S. No. of Open Dealer Outlets	Percent of Total Open Dealers
Major Oil Companies	27,890	53%
Regional Refiners	2,030	4%
"Super" Jobbers, etc.	1,100	2%
Small Jobbers	22,010	41%
Total Open Dealers	53,030	100%

Source: Table 3 of Appendix C

VI. IMPACT OF VAPOR-RECOVERY CAPITAL INVESTMENT REQUIREMENTS ON INDEPENDENT MARKETERS

A. INTRODUCTION

The objective of this chapter is to define the financial hurdles faced by independent marketers who attempt to obtain capital for vapor-recovery investments. As discussed in Chapter V, independent marketer prototype companies were developed and then used as a basis of discussion with various lending institutions. An assessment was then made of the ability of various types of independent marketers to borrow the necessary capital recovery funds. Based on industry trends and comments from lenders, an estimate of potential closures of retail outlets as a result of the inability to raise the capital vapor-recovery investments was made.

B. IMPACT OF VAPOR RECOVERY INVESTMENTS ON PROTOTYPE FINANCIAL CONDITIONS

The corporate prototype income statements and balance sheets before vapor recovery are summarized in Table 40. These data were adjusted to reflect the acquisition cost of vapor recovery equipment with the related term debt. Comments were then elicited from a sample of prospective lenders regarding the ability of the various independent marketer prototypes to borrow the necessary capital for vapor recovery.

Based upon capital and operating expenses provided by the EPA,* the investment requirements for Stage 1, plus Stage II vapor-recovery systems, range from 13% to 36% of the total corporate net worth for the prototype independent marketers.

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*See Appendix H

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TABLE 40. PROTOTYPE FINANCIAL SUMMARY*

	Large Independent Marketer/ Wholesaler	"Super" Jobber	Branded Jobber	Open Dealer
No. Service Stations Supplied	160	85	8	-
No. "Controlled" Retail Outlets	130	85	7	1
Annual Sales ($000)	$106,000	$69,967	$1,134	$144.3
Gross Margin ($000)	10,100	6,426	90	39.3
Net Profit, Pre-Tax ($000)	1,500	918	44	7.6
Pre-Tax Profit as Percent of Sales	1.41%	1.31%	3.88%	5.30%
Pre-Tax Return on Equity	28.4%	17.1%	21.5%	15.2%
Pre-Tax Return on Total Assets	7.1%	5.8%	9.1%	7.8%
Depreciation Expense ($000)	866.6	720.0	27.2	5.3
Profit after Federal Taxes** ($000)	750.0	459.0	22.0	3.8
Estimated Cash Flow ($000)	$1,616.6	$1,179.0	$49.2	$9.1

Source: Appendix M

*Assuming 15-year depreciation schedule

**Assume 50% tax rate.

As shown in Table 41, the overall cost of vacuum-assist systems for these independent marketer prototypes ranges from 40% to 70% higher than for the balance vapor-recovery system. However, vacuum-assist vapor recovery would only decrease the return on equity from 6% to 9% in the worst case of a complete marketer absorption of the vapor-recovery cost from what would have been the case without a vapor-recovery program. All four retailer segments would consider themselves severely impacted by vapor-recovery regulations. However, vapor-recovery investments as a percentage of total net worth are highest with the small jobbers. Furthermore, this group would also have the largest decrease in return on equity in a worse-case absorption of all vapor-recovery costs (i.e., a 9% decrease).

C. FINANCIAL CLIMATE FOR VAPOR-RECOVERY LOANS

The four prototype independent marketers will have a difficult time obtaining financing as a result of relatively high debt, current low earnings, and attrition in the industry, all of which have created a poor climate for initial loan discussions.

Loan decisions are not made in a vacuum. The loan officer will consider the general health of the applicant's industry in addition to applying the traditional four C's of credit (character, collateral, capacity, and capital). With applications from gasoline retailers, three factors will impact on the judgment of the potential lender:

1. price controls on gasoline, which may be removed,
2. the fact that the retail end of the oil industry has traditionally had low profit margins and currently is subject to intense competition, and
3. the unattractive nature of the collateral.

TABLE 41. VAPOR-RECOVERY IMPACT ON INDEPENDENT MARKETER

Prototype Marketer	Independent Marketer/ Wholesalers	Super Jobber	Small Jobber	Open Dealer
• Total Investment Stage I + II				
• Balance ($000)	1027	816	44	6
• Vacuum Assist ($000)	1508	1156	74	11
• Vacuum-Assist Percent Increase over Balance	47%	42%	68%	68%
• Net Worth Ratio				
• Balance Investment as Percent of Net Worth	19.4%	15.2%	22.0%	12.6%
• Vacuum-Assist Investment Percent of Net Worth	28.5%	21.5%	36.0%	21.2%
• Worst Case -- No Passthrough				
• "No Control" Return on Equity (ROE)	28.4%	17.1%	21.5%	15.2%
• Balance - ROE	27.1%	15.9%	20.2%	14.5%
• Vacuum Assist - ROE	26.8%	15.8%	19.6%	14.1%
• Percent Decrease ROE Vacuum Assist vs. "No Control"	6%	8%	9%	7%

Source: Appendix L

Price controls in any industry make a lender nervous because they represent conditions beyond the control of his borrower. The lender is considering a term exposure wherein his debt will be repaid from earnings to be generated in future time periods. Price controls may preempt his applicant's ability to realize such earnings.

By general lender standards, all of the prototype companies currently show an unattractive level of profit. The pre-tax range of profit to sales is from 1.3% to 5.3%. The applicant's financial condition will be analyzed for the current market and an attempt will be made to forecast future earnings. In searching for trends for this projection, the loan officer will be negatively influenced by a decreasing trend in gasoline retailing profitability.

One financial guide widely used in the banking industry is the Annual Statement Studies, compiled and published by Robert Morris Associates (the national association of bank loan and credit officers). The relatively low pretax profit-to-sales ratio of the independent marketer prototypes is generally validated by the limited samples of this banking ratio guide (see Table 42).

TABLE 42. GASOLINE SERVICE STATION RETURNS

Year	Pretax Profit to Sales	No. of Stations in Sample
1970	3.8%	34
1971	3.7%	32
1972	2.8%	50
1973	5.2%	53
1974	5.6%	59
1975	2.5%	71
1976	1.5%	91

Source: Robert Morris Associates' annual statement summaries.

Similar relatively low profit rates were depicted from jobber samples in a Financial Characteristics analysis sponsored by the Petroleum Marketing Education Foundation, PMEF (Table 43).

TABLE 43. FINANCIAL SUMMARY OF PMEF JOBBER

Year	Jobber Net Profit to Sales
1974	2.2%
1975	1.8%
1976	1.0%

Source: PMEF "Financial Characteristics of Petroleum Marketers, 1977"

The level of pretax return on equity - roughly 20% - is quite different. In most industries, the owner enhances the return on his investment by leverage - i.e., increasing the amount of debt the capital base is supporting. This situation creates conflicting positions for the owner and the lender. The owner will have a bias for debt expansion to preserve the return on equity that he cannot achieve from his profit on sales. The lender's bias will be to limit the expansion of debt to that point which he feels is a reasonable debt level for the specific company.

The resale value by either private sale or public auction of the collateral to be pledged is a prime consideration in the loan. For example, there is an active market for standard machinery equipment with established dealers and an easily ascertained price structure. Collateral support for loans is also a factor in various Small Business Administration (SBA) programs. The SBA applications must be supported with an appraisal of the pledged fixed assets, and indicated auction values must be sufficient to provide for full loan repayment.

However, vapor-recovery equipment would be considered "special - purpose" collateral with resale opportunities limited to the retail gasoline industry (i. e., the next dealer at the site). If an appraiser is employed to estimate the "auction value" of this equipment, he will deduct a significant discount to allow for the limited number of prospective buyers. Additionally, a high proportion of the costs to be financed are "non-recoverable" in that they represent an installation expense of no independent value. Therefore, a vapor-recovery installation at a service station represents very poor collateral to a lender, since its only value is for retail marketing at a specific site.

D. BALANCE SHEET CRITERIA USED BY LENDERS

The financial criteria used to evaluate a loan application for vapor recovery would be similar for all four prototype marketers. However, the magnitude of the required investments and the resulting level of debt of the two largest independent segments are significantly higher than those of the small jobber and open dealer (see Table 44).

The size of the projected debt for vapor recovery prohibits the two smaller companies from approaching the insurance industry, which has a minimum application size of at least $1 million. The two larger companies are precluded from consideration by the SBA which has an upper debt limit of $500,000 on its guarantee program and a $400,000 net profit maximum in defining eligible concerns.

In any approach to the commercial banking industry, the two smaller prototype companies will essentially have to rely upon their existing banking arrangements, with the strength of that relationship being the key to a successful loan application for vapor-recovery investment.

TABLE 44. VAPOR-RECOVERY DEBT REQUIREMENTS OF INDEPENDENT MARKETER PROTOTYPE
(Assuming 100% Debt Financing)

Company Type	Typical Sales Volume ($000)	Balance Vapor-Recovery Debt Required ($000)	Projected Total Debt after Vapor-Recovery Investment ($000)
A. Large Independent Marketer/Wholesaler	106,100	1,027	$9,161
B. "Super" Jobber	69,967	816	5,988
C. Branded Jobber	1,134	44	153
D. Dealer Owned/ Operated	144	6.3	51.3

Source: Appendix M

The two larger companies will have greater freedom to seek out an interested lender. However, their past credit record will be an important factor and their application will receive more detailed financial ratio analysis.

During a loan application analysis, the following common criteria would be used for reviewing all four prototype applications.

1. Cash Flow

The ratio of cash-to-current liabilities for potential loan applicants must be acceptable. This means that the borrowers have the potential to be good deposit accounts at their commercial banks. Such a factor strengthens the relationship with the bank and enhances the attractiveness of the loan applicant to the banker. All four independent marketer prototypes would successfully pass this test.

2. Debt/Equity Ratio

There is no fixed ratio of total debt to total equity which must be met for a company to qualify for a loan. Of course, a ratio greater than 1 indicates that the creditors have more at risk in the situation than does the owner and causes the banker to intensify his analysis.

In a rapid growth and/or high-profit situation, a banker may be willing to work with ratios ranging up to $3 of debt to $1 of equity in the following cases:

a) where he feels that this degree of leverage is temporary;

b) where the predictability of future equity growth from retained earnings is high;

c) where the quality of assets is good; and

d) where the collateral available to cover his exposure has secure marketability.

However, the banker will generally look for ratios below \$1.00 of debt for \$1.00 of equity in industries like gasoline retailing which seem to portray the following characteristics:

a) low profit margins,

b) limited future prospects, and

c) special-purpose collateral value (i.e., limited alternative use for the collateral).

The higher debt/equity ratios of the prototypes will not - of and by themselves - negate the borrowing request, but they will make the lender cautious in considering his ultimate exposure.

The ratio of total indebtedness to total equity is currently relatively high for gasoline retailers and will increase as additional debt is incurred for vapor-recovery equipment capital. The present ratios range from 1.2 to 2.9.

3. Current Ratio

A potential commercial borrower must show an acceptable current ratio (i.e., current assets to current liabilities) which is an indication of its ability to handle their short-term liabilities. Trends in the industry, however, may well begin to put pressure on current ratios. When suppliers were selling on 30-day terms, the combination of rapid inventory turnover and cash sales created an opportunity for the buyer to use his supplier credit as permanent capital, and invest it in non-current assets. Increasing crude prices have impacted the balance sheets of all links in the distribution chain with a resultant shortening of credit terms. A switch in terms from net 30-days to 1% discount for payment within 10-days strips the buyer of a form of financing previously available. Additionally, major sellers have improved their billing practices with real-time computer invoicing which starts their billing clock when a load is taken at the rack. The old systems normally yielded a three- or four-day slippage in the billing process. The current ratio of the prototype loan applicants would be within a generally acceptable range.

4. Debt Service Ability

There is some term debt presently outstanding in each prototype company. Most likely this debt is secured by trucks and equipment, since lenders have a strong proclivity for taking as much collateral as possible to support their exposure. The broadest form of collateral pledge under the Uniform Commercial Code is the execution of a financing statement covering "all fixed assets now owned or hereafter acquired." Such language assures the prime lender of control of debt repayment in that any subsequent lender must accept an unsecured position, negotiate for a partial release of collateral, or accept a secondary position on the specific collateral he has financed.

The single, most critical tests applied to all applicants will be their indicated ability to service (repay) their total term debt. A ratio analysis is generally used to relate annual net earnings to the required annual principal payments.

The severest ratio test will be that applied by the insurance industry which normally has higher quality selectivity in private placement activities than the commercial banking industry. A normal insurance industry requirement is that the total term debt to be serviced (including capitalized leases) will not exceed 5 to 6 times the average net profit realized over the last five years. When we apply such a standard to our applicants, all the prototype companies are close to or have exceeded their theoretical capacity for debt before the question of vapor equipment financing is even raised (see Table 45).

TABLE 45. INSURANCE INDUSTRY DEBT INDEX

Independent Marketer	Net Earnings* Index ($000)	Total Debt Capacity ($000)	Present Debt ($000)
Large Independent	$750 x 6 =	$4,500	$8,134
"Super" Jobber	459 x 6 =	2,754	5,172
Branded Jobber	22 x 6 =	132	109
Open Dealer	5.7 x 6 =	34.2	45.2

*50% effective tax rate for all prototypes, except the open dealer, who pays an effective personal income tax of 25%.

Source: Appendix N

Commercial banks and equipment finance companies generally make allowance for depreciation as a non-cash expense and look at the cash flow available to service term debt. This more liberal analysis, of course, will provide a more favorable determination for the independent marketer prototypes.

A 10-year repayment period has been assumed for term debt presently on the balance sheets and a five-year repayment period is used for the vapor-recovery equipment financing. In this case, the cash flow available to service total term debt is presented in Table 46 for the independent marketer prototypes.

TABLE 46. PROFORMA CASH FLOW

Independent Marketer	Estimated Annual Cash-Flow	Estimated Annual Debt Service (After Vapor Recovery)	Ratio Debt/ Cash Flow
Large Independent	$1,712,000	$1,018,000	61%
"Super" Jobber	1,254,700	680,400	56
Branded Jobber	53,300	19,700	38
Dealer Owned/ Operated	11,400	5,700	52

Source: Appendix N

There is no definite debt/cash flow ratio hurdle which would apply to all companies. However, for ratios in excess of 50%, the banker would question how the cash drain represented by debt service would impact upon the following:

- overall financial health of the corporate borrower,
- sales growth rate, and
- the banker's "cushion" for projection errors.

E. INSTITUTIONAL SOURCES OF CAPITAL FOR VAPOR RECOVERY LOANS

The size of loans and stringent loan criteria would most likely cut off the insurance industry as a capital source for vapor recovery. This leaves essentially three other external commercial alternatives for independent marketers to apply for the required funds associated with vapor recovery:

1. Commercial banks,
2. Small Business Administration, and
3. Finance companies.

1. Commercial Banks

Based on Arthur D. Little's contacts with financial institutions, the "independent" nature of petroleum marketers is not really clear to the banking industry. Few banking policies or practices have been developed to service and finance independent marketers. The volume of financial transactions by banks with independent marketers has not been large enough for industry specialists to have developed. To most bankers, the major oil companies still appear to overshadow the whole industry economically. A typical reaction to the need for vapor-recovery capital by independents initially seemed to be: "Oh, we don't do that; that's not our problem; those people can get the money required from the majors." Where bankers are aware of independent marketers, a loan decision for vapor recovery would be made on a "case-by-case" basis.

Furthermore, the pattern of financing by many independents cast a generally negative pail on this segment for many bankers. It is perceived that many independents have typically used "helter-skelter" financing for their growth (e.g., approaching different local thrift institutions for mortgage financing on each specific location being acquired). Frequently the property would be placed in a separate corporation whose debt would then be guaranteed by the parent corporation. This approach to financing growth has been advantageous to the borrower who is able to avoid the discipline inherent in a single lender relationship. However, when faced with a significant borrowing requirement, a company with this type of unconsolidated financing has two key disadvantages in competing for capital:

- No historical experience in presenting consolidated financial information in the required format; and
- The complex financing base created is difficult for the typical lender to analyze and understand.

At this time, the banking industry is coming out of a period of high loan losses and is concentrating on the quality of its credits. The lender will certainly consider whether the possibility of some temporary business conditions might create a default on his loan which could negatively impact on his own career. Then the income derived from this loan will hardly compensate for the expense of a bad debt collection process or a loss. Therefore, the banking industry will be highly selective in approving the required loan applications for vapor recovery investments. However, a loan applicant could possibly convince the lender of the merits of assuming a high debt level in a shrinking industry with low profit margins. Based on the marketer's track record, the banker may be persuaded to view the loan for vapor recovery as an entrepreneurial gamble required for survival until high competitive casualty rates result in a larger market share by the applicant. At this point, higher throughputs spread over a relatively fixed-cost base will bring an improved return on sales and investment. However, the smart lender certainly wonders if his judgment is keen enough to distinguish the few winners from the potential losers.

2. Small Business Administration

In May 1977, the SBA issued a new definition of a small business concern for the purpose of pollution control guarantee assistance under Public Law 94-305, which is as follows:

- a company where its affiliates are independently owned and operated, and not dominant in its field of operation,
- assets do not exceed $9 million,
- net worth less than $4 million,
- an average net income, after federal income taxes, for two prededing years less than $400,000, and
- average net income computed without benefit of any carry-over loss.

To be eligible for SBA direct or participation financing, a company must meet all of the above criteria. Generally only the small branded jobbers and open dealers would qualify for SBA assistance.

As indicated in Arthur D. Little's previous Stage II report,* SBA funds through the Direct Loan Program and/or the Economic Injury Program are limited with competition for those funds from various industries each containing many small businesses. The SBA Guarantee Program is a more likely source of assistance. In this case, the SBA ensures the loan risk taken by a commercial bank which takes the trouble to accept the loan application. In many banking circles, the application process and paper work associated with these SBA loans are considered too cumbersome to be worthwhile when relatively small amounts of money are involved. Thus, it is quite unlikely that the SBA will be a significant source of capital funds to the independent marketers for vapor-recovery investments.

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*Economic Impact of Stage II Vapor Recovery Regulation, November 1976, page 105.

3. Commercial Finance Companies

Commercial finance companies typically extend credit to borrowers who have been declined by banks as a result of marginal capitalization and earnings. However, the prototype independent marketers cannot expect much support from this financing source based on the following:

a. Inventory and equipment financing is clearly supplemental to the "bread and butter" business of the commercial finance industry, viz., accounts receivable financing. The prototype companies are essentially cash, or cash equivalent, operations with little accounts receivable created. Gasoline retailing thus falls outside the normal scope of interest of the commercial finance industry.

b. The unattractive nature of the collateral has a particular impact. The justification of a finance company in assuming a higher risk than a banker is that the investment being financed has a good resale value. Since the collateral here has limited liquidity, marginal gasoline retailers cannot expect the level of support by finance companies which might be available to companies in industries utilizing fixed assets with better resaleability.

F. CONCLUSIONS AS TO THE ABILITY OF INDEPENDENT MARKETERS TO OBTAIN VAPOR-RECOVERY FINANCING

1. Small Branded Jobbers and Open Dealers

Loan decisions for open dealers and small jobbers will be made by their local banks based almost entirely on the quality of their existing relationships. The standard review process of these banks will easily detect the low profit levels and the unattractive nature of the collateral. To overcome this initial handicap, a small jobber or open dealer will have to have a strong balance sheet and make an effective presentation to the lender. Small jobbers and open dealers will experience significant problems in obtaining the necessary capital for vapor-recovery investment from banks and various financial institutions. The unenthusiastic response to a loan application arises from a composite of the following factors:

- A perception of a single-purpose loan exposure by banks (i.e., little alternative use for vapor-recovery investment, except by other gasoline retailers using the same site), and
- A significant number of small gasoline retailers will not have the sophistication required to present a coherent, persuasive loan application.

The SBA is not viewed as an important financing alternative for vapor-recovery capital by small retailers, since its own funds are tight and the total capital pool is quite limited. Under the SBA loan guarantee program, the banker is provided with insurance protection on his credit risk. However, the SBA application and administration process is regarded as cumbersome and the necessary collateral appraisal presents a further problem.

Assuming a normal supply of lendable funds on the part of the banking industry, financial lenders contacted subjectively have estimated up to 60% of the open dealers/small jobbers would fail to pass a formal loan application test based upon the criteria discussed above. This hurdle would cover 47,000 outlets which generally represents the number of open dealers/small jobber stations operating below the national average station throughput of 39,000 gallons per month. However, personal factors and long-term banking relationships will override a potential rejection based on strict loan criteria with a number of small retailer applicants. This would be especially true for small jobbers with stations operating above the average lessee dealer break-even throughput of 27,000 gallons per month. As shown in Table 47, 9400 small independent stations are operating at a level of between 27,000 and 39,000 gallons per month.

However, a large number will seek financing from friends, relatives, private money lenders, and the non-institutional sources which recognizes the cash nature of the business.

Without financing for vapor recovery, the alternative for both the small jobber and open dealer will be a loss of his business and economic independence.

Additionally, suitable alternative employment may not be readily available in the local community or anywhere else within reason. Rather than close the business, it has been assumed that open dealers operating above an average 15,000 gallons per month break-even volume would most likely be able to get non-conventional financing (i.e., friends, relatives, etc.). This leaves approximately 23,000 stations operating below 15,000 gallons per month which would be unable to obtain vapor-recovery capital and be forced to close (see Table 47). However, it is fair to assume that, in the long run, other marketing factors and conditions would eventually have brought about the demise of most of these outlets. Vapor recovery would accelerate the closure decision, especially at the marginal, low-volume outlet.

TABLE 47. ESTIMATED CLOSURES OF SMALL JOBBERS/OPEN DEALER OUTLETS DUE TO INABILITY TO RAISE CAPITAL FOR VAPOR RECOVERY

	Segment	No. Outlets	Cumulative Surviving Outlets
Base	Total Small Jobber/Open Dealer Outlets (1977)	78,680	78,680
Less	No. Open Dealers/Small Jobbers Failing Loan Application Test	(47,000)	-
Plus	No. Open Dealers/Small Jobbers Failing Loan Tests That Get Bank Loans Based Upon Personal Assets/ Established Ties	9,400	-
Plus	No. Open Dealers/Small Jobbers Failing Loan Test and Obtaining Non-Standard Financing	15,040	56,120
Total	No. Open Dealers/Small Jobbers Unable to Obtain Capital for Vapor-Recovery Investment	22,560	56,120

2. Large Independent Marketer/Wholesaler and "Super" Jobbers

The two large marketer prototypes are not eligible for SBA assistance and do not meet the high-quality criteria of the insurance companies. However, most have some level of borrowing history with the commercial banking industry. A loan request will be evaluated within the framework of the overall guidelines which have been established in an existing bilateral relationship between the large independent and the bank. Some larger national banks and regional banks in oil-producing areas have specialty Petroleum Divisions, but these units tend to be staffed with specialists focusing on exploration, production, and refining. The relationship with independent marketers is normally not assigned to such industry specialists, but assigned on a strictly commercial basis consistent with the organizational style of a particular bank.

The major financial impact of vapor recovery on large independents will be the forced realignment of internal priorities to cope with the investment requirement for vapor recovery. Based upon managerial borrowing limits, established capital programs will have to be eliminated or postponed. In addition, added capital might also have to come from a dilution of ownership or asset disposition programs (i.e., some retail outlets may have to be sold and/or closed). Based on discussions with industry contacts, it is estimated that up to 10% of the large marketers could be forced to shut down all their stations without a buyer which would close approximately 1400 outlets. If the surviving large marketers could not justify capital outlays in direct salary outlets pumping less than 50,000 gallons per month, another 5000 outlets would be closed.

3. "Capital" Closure Summary

Under today's market conditions, the inability of independent marketers to obtain the required capital for vapor recovery investments could potentially result in the accelerated closing of up to 29,000 independent outlets (Table 48).

However, most of these outlets would have eventually had to close as a result of the continuing competitive rationalization of gasoline retailing discussed in Chapter IV.

TABLE 48. POTENTIAL CLOSURES OF INDEPENDENT OUTLETS DUE TO LACK OF CAPITAL FOR VAPOR RECOVERY

Sectors	Total Outlets (1977)	Potential Capital Access Closures	Potential Closure as Percent Total 1977 Population
Open Dealers/Small Jobbers	78,680	22,560	29%
Independent Marketer/ Wholesaler "Super Jobbers"	28,700	6,400	23%
Total Independents	107,380	28,960	27%

VII. VAPOR-RECOVERY IMPACT ON SERVICE STATION PROFITABILITY

The purpose of this chapter is to assess the economic consequences of investment in vapor-recovery systems at service stations. For a given level of station investment, the major impact of this program will be to raise the break-even volume threshold from current levels to higher volumes as vapor recovery adds another fixed cost at a given station. Some service stations may be put into a marginal status (i.e., below a break-even volume) by vapor-recovery costs alone. The total number of these outlets made marginal after the absorption of vapor-recovery costs is assumed to approximate the number of potential closures resulting from insufficient profitability after vapor recovery. However, not all of these potential closures will necessarily take place for the same reasons that not all prevapor-recovery stations will actually close (as discussed in Chapter IV).

A. FINANCIAL ASSUMPTIONS

In the economic analysis of the prototype service stations, assumptions were made regarding the long-term minimum rates of return acceptable to the owners. However, if these rates of return are not realized in the short term, the owner may not necessarily close down the station. As discussed, current margins are severely depressed with many owners receiving lower rates of return than would normally be acceptable. However, many stations continue to operate with expectations of better conditions in the future and some dealers may not have attractive job alternatives. Furthermore, many dealers do not distinguish clearly between the return on capital and the earnings from their own labor as station managers. So long as they can survive financially, even working longer hours, many will continue in business on the expectation of a future financial turnaround.

Station owners may also accept apparently low rates of return, since the sales value of the site for alternative uses is low in many cases. On the other hand, since many sites may also be highly depreciated, the apparent low rate of return on capital is partly attributable to a high valuation of the asset base.

The financial assumptions shown in Table 49 reflect the assumed internal financial charges of the various prototype stations applicable for added investment such as vapor recovery. For this illustrative exercise, the capital charge developed is equal to the cash flow required to cover the debt for a given interest rate and financial life of vapor-recovery equipment.

The interest rate for lessee dealers, direct (major), and "C" stores reflect a minimum internal hurdle rate and system project life which typically would be used by integrated oil companies. The interest rate and life of the open dealer and direct independent prototype are more of a reflection of a composite of financial terms which might be available from commercial banks (see Table 34).

TABLE 49. CAPITAL CHARGES FOR VAPOR-RECOVERY FINANCING

Service Station Segment	Interest Rate (%)	Recovery* Period	Capital Recovery Factor
Lessee Dealer	16%	10	.207
Direct Operations (Major)	16%	10	.207
Open Dealer	12%	5	.277
Direct Operations (Indep.)	12%	5	.277
"C" Store Gasoline Operations	16%	10	.207

*Assume zero salvage value for vapor-recovery systems

Source: Industry contacts and Arthur D. Little estimates

The impact of vapor recovery capital charges and operating expenses on current service station economics was tested on two alternative assumptions:

- A competitive pass-through of vapor-recovery costs; in this case, the vapor-recovery cost-per-gallon of the most efficient type of station in each competitive segment of the market can be passed on by all stations. Thus, the most efficient station will have no margin reduction from vapor recovery. Other less efficient stations must absorb the difference between their cost per gallon for vapor recovery and the vapor recovery cost per gallon of the most efficient station.
- No pass-through of vapor recovery cost for any station.

The market was divided into two segments with competition assumed within each segment but not between segments. Stations in each volume sector generally would be operated in similar environments and competing for the same type of customer. However, outlets in the low-volume sector would tend to be in more rural and/or protected markets. Thus, the rural open dealer is not necessarily bound by the competitive actions of a direct salary, high-volume station in a major metropolitan area. The minimum vapor-recovery cost per gallon is set by the most efficient type of outlet, and this is assumed to be passed on by all retailers in the following two broad market segments:

- High-Volume/Low-Cost Sector - consisting of all direct operations (majors and independents); the high-volume* lessee dealer outlets; and all the convenience store outlets because of the low operating expenses of this type of operation.
- Low-Volume/High-Cost Sector - encompassing open dealer outlets; and low- and medium-volume lessee dealer stations.

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*80,000 gallons per month or more

B. VAPOR RECOVERY COST IMPACT ON RETAIL GASOLINE MARGINS

The impact of vapor recovery has been evaluated under four sets of conditions, as shown in Appendix K:

1. competitive pass-through of balance system costs,
2. competitive pass-through of vacuum-assist costs,
3. no pass-through of balance system costs, and
4. no pass-through of vacuum-assist costs.

In the case of competitive cost pass-through, the most efficient stations are able to recoup all their vapor-recovery costs, while the margins at other stations are reduced to the extent that their unit costs of vapor recovery are higher than the most efficient outlets. In the case of no pass-through, all outlet margins are reduced, but the less-efficient stations are, of course, still differentially affected as a result of economies of scale resulting in higher unit costs than for higher volume stations.

Since vacuum-assist systems are more expensive, their economic impact is greater than that of vapor balance systems, except for those efficient stations which were able to pass on 100 percent of their costs.

In the high-volume/low-cost sector of the market, the lowest cost is \$0.0008 per gallon for vapor balance, and \$0.0012 per gallon for vacuum assist for the 150,000 gallon per month direct major operation (see Table 50). The low-volume outlets, particularly the convenience stores, have the highest cost per gallon in this sector.

In the low-volume/high-cost segment, the open dealer operation, with a throughput of 50,000 gallons per month, has the lowest vapor-recovery cost per gallon -- \$0.0033 for vapor balance and \$0.0055 for vacuum assist (see Table 51).

TABLE 50. COSTS OF VAPOR-RECOVERY COMPLIANCE IN HIGH-VOLUME SECTOR

Throughput	Low Volume	Medium Volume	High Volume
Lessee Dealer Operation			
• Vapor Balance	Low Sector Outlet	Low Sector Outlet	0.0015
• Vacuum Assist			0.0025
Direct Operation (Major)			
• Vapor Balance	0.0030	0.0014	0.0008
• Vacuum Assist	0.0045	0.0021	0.0012
Direct Operation (Independent)			
• Vapor Balance	0.0019	0.0013	0.0009
• Vacuum Assist	0.0029	0.0019	0.0013
Convenience Store Station			
• Vapor Balance	0.0075	0.0034	0.0018
• Vaccum Assist	0.0175	0.0084	0.0046

Least Cost of Compliance		
• Vapor Balance =	0.0008	High-Volume, Direct (Major) Operation
• Vacuum Assist =	0.0012	High-Volume, Direct (Major) Operation
Highest Cost of Compliance		
• Vapor Balance =	0.0075	Low-Volume Convenience Store
• Vacuum Assist =	0.0175	Low-Volume Convenience Store

Source: Appendix O

TABLE 51. COSTS OF COMPLIANCE IN LOW-VOLUME SECTOR

Throughput	Low Volume	Medium Volume	High Volume
Lessee Dealer Operation			
• Vapor Balance	0.0060	0.0041	High Sector Outlet
• Vacuum Assist	0.0150	0.0063	
Open Dealer Operation			
• Vapor Balance	0.0130	0.0049	0.0033
• Vacuum Assist	0.0250	0.0088	0.0055
Least Cost of Compliance			
• Vapor Balance =	0.0033 High-Volume, Open Dealer Operation		
• Vacuum Assist =	0.0055 High-Volume, Open Dealer Operation		
Highest Cost of Compliance			
• Vapor Balance =	0.0130 Low-Volume, Open Dealer		
• Vacuum Assist =	0.0250 Low-Volume, Open Dealer		

Source: Appendix O

It is clear that vapor-recovery costs per gallon decline as the station throughput increases as a result of the following:

- The high fixed-cost component for vapor-recovery represented by the capital cost is two to four times higher than the operating cost, depending upon both the type of vapor recovery and station throughput.
- Capital costs per nozzle are estimated to be higher for small outlets than for large. For a three-nozzle outlet, the vapor recovery cost per nozzle is approximately $1,500 for the balance system and $3,000 for vacuum assist. At a 15-nozzle outlet, the cost per nozzle is approximately $750 for vapor balance and $1,000 for vacuum assist (see Appendix H).
- As directed by the EPA, we have allowed a credit for the recovery of gasoline as a result of vapor recovery. This credit is directly proportioned to volume, and in high-volume operations can exceed annual operating expense of the vapor recovery systems (see Appendix I).

The direct economic effect of vapor recovery is therefore to reinforce the existing economies of scale in gasoline marketing. With a competitive passthrough of costs, the economics of the high-volume outlets will not be significantly affected, and their competitive position may be strengthened.

C. VAPOR-RECOVERY IMPACT ON SERVICE STATIONS PROTOTYPES

The impact of vapor recovery on the margins of the five prototype stations is detailed in the cost worksheets of Appendix O. The breakeven volume after vapor recovery is the measure of economic "viability" used in this analysis.

The competitive passthrough of vapor-recovery costs shown in this analysis is limited only to the full cost passthrough of the most efficient marketers in each of the two market segments. The break even volumes for the various service station prototypes, both before and after vapor recovery, are shown in Table 52. These volumes were interpolated from the impact cost data for each segment in Tables 53 - 57. However, many dealers will stay in business as long as they can cover their salaries and expenses, even though this results in a zero cash flow from the point of view of getting a

TABLE 52. ECONOMIC IMPACT IN SERVICE STATIONS: CHANGE IN BREAKEVEN THROUGHPUT VOLUME ASSUMING COMPETITIVE PASSTHROUGH OF COSTS*

(gal/month)

Operation	Breakeven Volume		
	Pre-Compliance	Vapor Balance	Vacuum-Assisted
Lessee Dealer Operation	27,500	28,300 (34,200)	28,300 (48,300)
Direct Operation (Major)	91,700	95,000 (98,300)	95,800 (100,000)
Open Dealer Operation	15,400	17,900 (19,600)	20,000 (23,300)
Direct Operation (Independent)	108,300	111,200 (113,300)	112,500 (115,400)
Convenience Store	5,800	9,600 (10,000)	13,700 (15,000)

*Figures in parentheses reflect no passthrough assumption

SOURCE: Tables 53-57

return on their capital investment. The outlets that earn minimum target breakeven volume while market conditions are depressed are highly likely to survive the present market attrition and pick up added volume from stations that are closed.

1. Lessee Dealer/Full Service Operation

The low- and medium-volume prototype outlets -- 20,000 and 35,000 gallons per month -- are full-service, neighborhood outlets with competition from other relatively low-volume/high-cost outlets. Relative to most other types of stations, the lessee dealers in this segment should be able to pass-through most of the costs of vapor recovery (see Table 53).

The high-volume lessee outlet with a throughput of 80,000 gallons per month is assumed to be competing in the high-volume/low-margin sector of the market. The ability of this lessee dealer to passthrough additional costs of vapor recovery will be limited by the vapor-recovery cost of the most efficient high-volume marketer (i.e., high-volume, direct major station).

TABLE 53. ECONOMIC IMPACT* ON LESSEE DEALER PROTOTYPE STATION

	1977$		
Throughput Level	Low Volume	Medium Volume	High Volume
Monthly Volume (000 gal)	20	35	80
Contribution to Capital Costs**			
Pre-Vapor Recovery	(4,920)	2,016	6,240
With Vapor Recovery:			
Competitive Passthrough			
Vapor Balance	(5,562)	1,683	5,565
Vacuum Assist	(6,114)	1,701	5,025
No Passthrough			
Vapor Balance	(6,354)	297	4,797
Vacuum Assist	(7,434)	(294)	3,873

*After dealer's salary and depreciation but BFIT

**Stage I plus Stage II vapor-recovery impact

Source: Appendix O

2. Direct Operation (Major Oil Company)

The economic impact of vapor recovery on these self-service outlets is relatively small, assuming a competitive passthrough of costs. The reason is that the high-volume outlet (with a throughput of 150,000 gallons per month) is the lowest-cost operation among all the prototype stations, with vapor-recovery cost per gallon of $0.0008 for vapor balance systems and $0.0012 for vacuum assist. Even the relatively low-volume outlet (with a throughput of 50,000 gallons per month) has vapor-recovery cost per gallon of less than half of one cent -- $0.0030 for vapor balance and $0.0045 for vacuum assist. The changes in the contribution to capital cost before and after vapor recovery for major direct salary outlets is shown in Table 54.

TABLE 54. ECONOMIC IMPACT* ON DIRECT OPERATION (MAJOR OIL COMPANY) SELF-SERVICE PROTOTYPE STATION

Throughput Level	1977$ Low Volume	1977$ Medium Volume	1977$ High Volume
Monthly Volume (000 gal)	50	100	150
Contribution to Capital Costs**			
Pre-Vapor Recovery	(12,120)	2,640	25,200
With Vapor Recovery:			
Competitive Passthrough			
Vapor Balance	(13,418)	1,973	25,200
Vacuum Assist	(14,102)	1,595	25,200
No Passthrough			
Vapor Balance	(13,898)	1,013	23,744
Vacuum Assist	(14,822)	155	22,988

* i.e., net margin, BFIT, under various vapor recovery scenarios
**i.e., of Stage I plus Stage II vapor recovery

Source: Appendix O

3. Open Dealer Operation

The throughputs of open dealer prototype stations are 10,000/30,000/50,000 gallons per month. All these operations are assumed to be in the relatively low-volume/high-cost sector of the market.

The impact of vapor recovery on this type of station is strongly influenced by volume; the open dealer 50,000 gal/month outlet has the lowest cost-per-gallon in the low-volume/high-cost sector of the market (i.e., \$0.0033 for vapor balance and \$0.0055 for vacuum assist). At the other end of the size range, however, the lowest volume open dealer outlet has vapor-recovery cost per gallon of \$0.0130 for vapor balance and \$0.0250 for vacuum assist. The economic impact of vapor recovery on the contribution to capital costs is shown in Table 55. It is clear that the difference between the passthrough and no passthrough situations is very significant, because the level of costs passed through is quite high.

TABLE 55. ECONOMIC IMPACT* ON OPEN DEALER FULL-SERVICE PROTOTYPE STATION

	1977$		
Throughput Level	Low Volume	Medium Volume	High Volume
Monthly Volume (000 gal)	10	30	50
Contribution to Capital Costs**			
Pre-Vapor Recovery	(2,016)	5,220	10,620
With Vapor Recovery:			
Competitive Passthrough			
Vapor Balance	(3,180)	4,639	10,620
Vacuum Assist	(4,358)	4,050	10,620
No Passthrough			
Vapor Balance	(3,576)	3,451	8,642
Vacuum Assist	(5,018)	2,070	7,339

*After dealer's salary and depreciation but BFIT
**i.e., for Stage I plus Stage II vapor recovery
Source: Appendix O

4. Direct Operation (Unbranded Independent)

The economic impact on this kind of operation (Table 56) is similar to that on the major oil company direct operation described above. Both types of stations are generally high-volume, low-margin operations. Some differences are caused by the different financing assumptions used. It is assumed that the direct major station has internal corporate funds for vapor recovery, while the independent goes outside to a bank for financing.

TABLE 56. ECONOMIC IMPACT* ON DIRECT OPERATION (INDEPENDENT) SELF-SERVICE PROTOTYPE STATION

	1977$		
Throughput Level	Low Volume	Medium Volume	High Volume
Monthly Volume (000 gal)	100	150	200
Contribution to Capital Costs**			
Pre-Vapor Recovery	(3,960)	12,960	20,640
With Vapor Recovery:			
Competitive Passthrough			
Vapor Balance	(5,323)	12,104	20,439
Vacuum Assist	(5,981)	11,772	20,431
No Passthrough			
Vapor Balance	(6,283)	10,664	18,519
Vacuum Assist	(7,421)	9,612	17,551

* i.e., net margin, BFIT, for various vapor-recovery scenarios

** i.e., for Stage I plus Stage II vapor recovery

Source: Appendix O

5. Convenience Store Station

This type of operation has poor vapor-recovery economics to the extent that it is a relatively low-volume, low-margin type of outlet, competing with relatively high-volume, low-margin operations. The cost of vapor recovery tends to be high, and not much of it can be passed through on a competitive passthrough basis. The economic impact of vapor recovery on the gasoline operations of "C" stores is shown in Table 57.

TABLE 57. ECONOMIC IMPACT* ON CONVENIENCE STORE SELF-SERVICE PROTOTYPE STATION

	1977$		
Throughput Level	Low Volume	Medium Volume	High Volume
Monthly Volume (000 gal)	10	20	35
Contribution to Capital Costs**			
Pre-Vapor Recovery	960	3,600	9,786
With Vapor Recovery:			
Competitive Passthrough			
Vapor Balance	154	2,986	9,370
Vacuum Assist	(1,014)	1,866	8,348
No Passthrough			
Vapor Balance	58	2,794	9,034
Vacuum Assist	(1,158)	1,578	7,844

*Net margin, before federal income tax, under various vapor recovery scenarios

**i.e., for Stage I plus Stage II vapor recovery

Source: Appendix O

D. SUMMARY

Once vapor-recovery investments have been made, the margins of high-volume retailers, direct salary stations will not be significantly affected as a result of the added fixed-cost of vapor recovery. Leasee dealers are only significantly impacted when a competitive cost passthrough of the most efficient marketer is prohibited. However, open dealers and convenience stores will face significant margin reductions as a result of their relatively low throughputs both with and without a competitive passthrough of vapor recovery costs.

VIII. VAPOR-RECOVERY IMPACT ON THE SERVICE STATION POPULATION

A. CLOSURES INDUCED BY THE COSTS OF VAPOR RECOVERY

One of the objectives of the economic analysis of vapor-recovery requirements is to assess the potential number of retail outlets driven out of business by vapor recovery alone. As stated previously, there are many factors in the retail service station market which have resulted in a shrinking service station population. Chapter VI discussed the closures to be expected from the inability of some marketers to raise the necessary capital for vapor recovery. Many of these stations would have closed whether or not vapor-recovery investment were required. This chapter examines the potential additional closures to be expected among stations that do make the vapor-recovery investment. As a tool in defining these additional vapor-recovery-induced closures, the prototype break-even analysis was applied to the service station population described in Chapter II. At the present time, approximately 44% of the total service stations are operating below the prototype break-even volumes (see Table 58).

The largest number of potential closures from the group of marginal outlets will be in the lessee dealer group and low-volume, direct-salary operations. The open dealers generally have older and more highly depreciated stations than direct and lessee outlets. Furthermore, the open dealer may have no employment alternative and would be willing to operate at a marginal level of profitability. On the other hand, the number of convenience stores with gasoline operations is expected to increase.

While almost 78,000 outlets are currently operating below the prototype breakeven volumes, the service station closure rate is not expected to be that severe. As shown in Table 31, the 1981 service station population without vapor recovery is expected to fall to approximately 149,000 outlets. This

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TABLE 58. MARGINAL STATIONS BELOW PROTOTYPE BREAKEVEN POINT VOLUMES BEFORE VAPOR RECOVERY COSTS

Type Operation	Marginal Outlets Below Break-Even Volume	Marginal Outlets as Percent of 1977 Audit
Lessee	44,957	54%
Direct - Major	7,710	74%
Direct - Independent	17,301	80%
Open Dealer	7,804	15%
"C" Store	-	0%
Total	77,772	44%

Source: Table 27

implies that approximately 29,000 service stations will close due to market rationalization factors by 1981. The potential incremental closures due to vapor recovery are assumed to be equal to the number of facilities currently above the break-even point which fall below that point as a result of vapor recovery. Table 59 shows the number of outlets directly put into a marginal status by vapor recovery under various scenarios. The surviving facilities should be able to operate at economic levels greater than breakeven, since only 66% of the 1977 service station population would remain to service a higher gasoline demand in 1981.

With a competitive cost passthrough, vapor recovery costs will raise the breakeven volume for all but the most efficient outlets in the two market segments. Some stations that were operating at or above the breakeven point will then fall below the higher breakeven volume resulting from vapor recovery. It is estimated that 7% to 11% of the 1977 population of service stations could be placed into this marginal category, even with a competitive cost passthrough

TABLE 59. POTENTIAL VAPOR RECOVERY-INDUCED CLOSURES -- BREAKEVEN POINT METHOD

Type Station Type Vapor-Recovery System	Breakeven Method		
	Competitive Cost Passthrough	No. of Outlets Made Marginal by Vapor Recovery	
		Balance	Vacuum Assist
Lessee	yes	305	305
Direct - Major	"	97	114
Open Dealer	"	61	84
Open Dealer	"	12,225	17,573
"C" Stores	"	233	1,648
Total	"	12,921	19,724
% of 1977 Service Station Population		7%	11%
Lessee	no	6,473	18,794
Direct - Major	"	149	187
Direct - Independent	"	111	164
Open Dealer	"	16,017	21,368
"C" Store	"	366	2,562
Total	"	23,116	42,875
% of 1977 Service Station Population		13%	24%

Source: Arthur D. Little estimates

of a vapor-recovery program (Table 59). Depending on the type of vapor-recovery system, this means that from almost 13,000 to 20,000 stations would potentially be closed. With a complete absorption of vapor-recovery costs by the station operator (i.e., no competitive passthrough), potential closures would range from 13% to 24% of the current service station population (i.e., 23000 to 43000 outlets).

The actual severity of potential closures due to vapor recovery is a function of:

- the type of vapor recovery system used (balance, aspirator assist, vacuum assist);
- the degree and nature of a competitive passthrough of vapor recovery costs (from a complete operator absorption to an unrealistic complete passthrough for all stations), and
- the cost of capital.

B. SERVICE STATION POPULATION FORECAST -- AFTER VAPOR RECOVERY

The vapor-recovery-adjusted service station population forecast for 1981 is presented in Table 60. The population of 1977 was used as a base from which closures due to each of the following factors were subtracted:

- closures due to current market rationalization factors,
- closures resulting from an inability to raise capital for vapor recovery,
- closures resulting from adequate profitability after a passthrough level of vapor recovery costs limited to that of the most efficient competitive retailers.

Four alternative scenarios for the 1981 service station population were assessed, depending upon the type vapor recovery system and the amount of a vapor-recovery cost passthrough.

TABLE 60. FORECAST OF 1981 SERVICE STATION POPULATION AFTER VAPOR RECOVERY
(Stage I Plus Stage II)

				1981 Service Station Population-With Various Vapor-Recovery Systems			
Type Station	1977 Population	Net Closures By 1981 Based on Market Factors	Closures Based On Capital Constraints for Vapor Recovery	Balance Cost Passthrough	Vacuum Assist-Cost Passthrough	Balance-No Cost Passthrough	Vacuum Assist-No Cost Passthrough
Lessee	83,690	29,672*	14,756	54,018	54,018	54,018	54,018
Direct-Major	10,330	1,542*	-	8,788	8,788	8,788	8,788
Direct-Ind.	21,740	5,190	6,400*	15,340	15,340	15,340	15,340
Open Dealer	53,030	3,122	7,804	40,805**	35,457**	37,013**	31,662**
"C" Stores	9,600	(10,400)***	-	19,767**	18,352**	19,634**	17,438**
Total	178,390	29,126	28,960	138,718	131,995	134,793	127,246

*Subtracted from the 1977 audit to derive for 1981 forecast.

**Vapor recovery-induced closure of Table 58 subtracted from the 1977 audit, plus net outlet additions to obtain 1981 forecast.

***Net additions 1978-1981

Source: Arthur D. Little estimates

The net result of the total closures resulting from both vapor recovery and other market factors will be a reduction of 12% to 29% of the 1977 population of retail gasoline facilities by 1981 (Table 60).

This level of closures is 6% to 13% greater than might otherwise be the case without a national vapor-recovery program. Vapor-recovery investment will add to the fixed station operating costs and thus increase the opportunities to realize economies of scale in unit costs at high-volume outlets. This will penalize lessee and open dealers. As shown in Table 61, both the proportional and absolute numbers of open dealers will decline under the various vapor-recovery alternatives. The absolute number of other types of outlets will also decline, except for convenience store outlets which will increase in any case.

C. TOTAL VAPOR-RECOVERY COST FOR THE ADJUSTED SERVICE STATION POPULATION

Depending upon the type of vapor-recovery system and the degree of cost passthrough, the 1981 service station population could range from 127,000 to 138,000 outlets after attrition due to both vapor-recovery and other marketing factors (as detailed in Appendix P). The vapor-recovery investment cost* for this estimated 1981 service station population would range from $957 million to $1,538 million. The lowest vapor-recovery cost total would be for the balance system with no passthrough of costs. The balance systems with a cost passthrough would have fewer closures and thus greater total costs. Similarly, the vacuum-assist case with a passthrough of costs would be the most expensive system.

As shown in Table 62, the total cost** of vapor recovery over a 10-year life would range from $2.0 to $3.1 billion which includes investment,

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*Investment for equipment and installation only.

**Total cost is equal to the investment plus financing charge and 10 years of operating expenses.

TABLE 61. SERVICE STATION POPULATION OUTLOOK

Type Operation		1981 Service Station Forecast				
		Balance		Vacuum Assist		Base Case -- No Vapor Recovery
Competitive Passthrough	1977 Audit	Yes	No	Yes	No	
Lessee	47%	39%	41%	40%	42%	36%
Direct-Major	6%	6%	7%	7%	7%	6%
Direct-Independent	12%	11%	12%	11%	12%	11%
Open Dealer	30%	30%	27%	27%	25%	34%
"C" Store	5%	14%	14%	15%	14%	13%
Total	100%	100%	100%	100%	100%	100%
No. Outlets	178,390	138,718	131,995	134,793	127,246	149,264
% 1977 Audit	100%	78%	74%	76%	71%	84%
Vapor Recovery Closures % 1977 Audit	-	6%	10%	8%	12%	0%

TABLE 62. TOTAL VAPOR-RECOVERY COSTS* FOR THE 1981 POPULATION OF SERVICE STATIONS

			Vapor-Recovery Costs ($ Million)				
Type System	Cost Pass-Through	Total No. Outlets	Total Invest-ment	Total Financing Costs	10 Years of Operating Expenses	Total Vapor-Recovery Costs	Unit Vapor-Recovery Cost ($/gal)**
Balance	Yes	138,718	998	471	631	2,100	0.0023
Balance	No	131,995	958	458	610	2,026	0.0022
Vacuum Assist	Yes	134,793	1,540	727	817	3,084	0.0033
Vacuum Assist	No	127,246	1,404	682	738	2,824	0.0030

*Stage I plus Stage II

**932.1 billion gallons over 10 years = 1.8% P.A. growth rate in gasoline demand.

financing cost, and 10 years of operating expenses. This represents only approximately 75% of the total cost for vapor recovery which would be required to equip the entire current 1977 service station population. The unit cost impact of vapor recovery to the economy for the expected 1981 population would range from $0.0022 to $0.0033 per gallon, depending upon the type system adopted and the extent to which station operators can pass through their costs.

As an alternative to Stage I plus Stage II vapor recovery at service stations, some reduction of hydrocarbon vapors (including benzene) can be made with just Stage I controls. Based upon costs provided by the EPA (Appendix H, Table 3), the total investment for this program for the 1977 service station population is approximately $225 million which represents 19% of the cost for Stage I plus Stage II vapor recovery systems (see Table 21). The average cost for Stage I alone is approximately $1500 per service station with the coaxial tube system alternative equalling approximately 30% of the Stage I balance cost. As shown in Table 63, it is highly unlikely that capital constraints for Stage I will result in a significant number of stations closing over and above those which are most likely to close due to market rationalization pressures.

Similar to the Stage I plus Stage II analysis, the estimated incremental closures due to decreased profitability by Stage I alone were derived from the estimated number of marginal outlets induced by Stage I investments (i.e., the number of outlets currently operating between the pre- and the post-Stage I breakeven point volumes -- see Appendix Q - Figures Q-1 and Q-2). Assuming a competitive passthrough of costs, the unit cost impact of Stage I alone for various service station prototypes are shown in Appendix Q, Tables Q-2 through Q-6). It is estimated that approximately 500 service stations could be closed from Stage I controls over and above those expecting to close due to market rationalization (see Table 64).

TABLE 63. STAGE I CAPITAL CONSTRAINTS

Type Station	1977 Outlet Population	1981 Closures Due to Market Factors	Estimated Stage I Capital Constraint Closures*	Estimated 1981 Service Station Population** With Stage I Only Controls
Leasee	83,690	29,672	9,007	54,018
Direct-Major	10,330	1,542	-	8,788
Direct-Independent	21,740	5,190	5,173	16,550
Open Dealer	53,030	3,122	1,250	49,908
"C" Store	9,600	(10,400)	-	20,000
Total	178,390	29,126		149,264

*See Appendix Q - Table Q-1

**Subtract the largest number of closures due either to market factors or capital constraints from the 1977 outlet audit.

TABLE 64. STAGE I-INDUCED CLOSURES DUE TO INSUFFICIENT PROFITABILITY

Type Station	Estimated 1981 No Control Population	Stage I-Induced Marginal Units	Estimated Number of Closures from Marginal Units	Estimated Number of Closures	Stage I Closures as of 1981 No Control Population
Leasee	54,018	312	66%	296	0.4%
Direct-Major	8,788	80	20%	16	0.2%
Direct Independent	16,550	5	30%	2	-
Open Dealer	49,908	781	40%	312	0.6%
"C" Store	20,000	60	0%	0	-
Total	149,264	1,238	43%	536	0.4%

Stage I induced closures thus represent approximately 0.4% of the total estimated 1981 population of service stations without any vapor-recovery controls. The most significant impact of Stage I alone controls would be borne by the low-volume open dealers. It is reasoned that with the Stage I only program, most open dealers would opt for the less expensive coaxial Stage I system. As illustrated in Appendix Q-Table Q-7, this step would even further reduce closures from the Stage I program by more than 50%.

APPENDIX A

REFINER/MARKETER LIST

TABLE A-1

MAJOR OIL COMPANIES[a)]

Major Oil Companies	Total Number of States Where Gasoline Brand is Marketed
American Petrofina of Texas	29
Amoco Oil Co. (Standard Oil of Indiana)	48
Atlantic Richfield Co. (Arco)	37
Chevron U.S.A. Inc. (Standard Oil of California)	40
Cities Service Oil Co. (Citgo)	27
Continental Oil Co. (Conoco)	29
Exxon Co. U.S.A.	45
Getty Refining and Marketing Co.	28
Gulf Oil Co., U.S.A.	31
Mobil Oil Corp.	48
Phillips Petroleum Co.	37
Shell Oil Co.	40
Standard Oil Co. of Ohio (Sohio)	N/A
Sun Oil Co. (Sunoco)	N/A
Tenneco Oil Co.	21
Texaco Inc.	51
Union Oil Co. of California	45

[a)] a fully-integrated company (i.e. active in all phases of the oil business - exploration, production, refining, supply, transportation and marketing) which markets in at least 21 states.

Source: 1977 NPN Factbook

TABLE A-2

REGIONAL REFINERS[a)]

Regional Refiners	Total Number of States Where Gasoline Brand is Marketed
Amerada Hess	NA
Apco Oil Corp.	14
Ashland Petroleum Co.	10
Champlin Petroleum Co.	18
Crown Central	NA
Clark Oil and Refinery Co.	13
Coastal States (Derby)	19
Diamond Shamrock Oil and Gas Co.	9
Douglas	NA
Kerr-McGee Corp.	19
Lion Oil Co.	14
Marathon Oil Co.	6
Murphy Oil Corp.	15
Derby Refining Co.	14
Husky Oil Ltd.	17
Koch Marketing Co.	30
Naph-Sol Refining Co.	5
Quaker State Oil Refining Corp.	4
Total Petroleum, Inc.	2
United Refining Co.	5
Vickers Petroleum Corp.	15

a) a semiintegrated company with at least one refinery and generally marketing in less than 21 states.

Source: 1977 NPN Factbook

APPENDIX B

SERVICE STATION THROUGHPUT MATRIX

TABLE B-1

SERVICE STATION MATRIX BY THROUGHPUT

USA

DIRECT SUPPLIER	MONTHLY THROUGHPUT 000 GALL) (MG/MO)					Total Outlets	%Total Outlets	%Total Outlets Offering Self-Serve[a]
	≤ 10	11-24	25-49	50-99	≥ 100			
MAJOR	4,860	43,570	23,420	11,280	2,140	85,270	48%	26%
OTHER	3,240	29,080	32,320	21,990	6,490	93,120	52%	42%
TOTAL OUTLETS	8,100	72,650	55,740	33,270	8,630	178,390	100%	35%
% TOTAL OUTLETS	4%	41%	31%	19%	5%	100%		
TOTAL VOLUME (MMG/YR)	680.5	18,699.5	24,748.5	28,252.8	12,030.7	84,412.0		
% TOTAL VOLUME	1%	22%	30%	33%	14%	100%		
% TOTAL OUTLETS OFFERING SELF-SERVE[a]	.8%	16%	33%	56%	5%	35%		
SELF-SERVE VOLUME (MMG/YR)	53.5	2,762.7	4,010.0	15,060.8	10,394.8	32,281.8		
% TOTAL SELF-SERVE VOLUME	-	9%	12%	47%	32%	100%		

[a] Percent total outlets offering a self-serve option including 34,150 total self-serve outlets and 27,490 split island (full-serve/self serve) operations.

Source: 1977 NPN Fact book, U.S. Census of Retail Trade, FEA, Lundberg letter, Industry contacts, ADL estimates.

TABLE B-2
SERVICE STATION MATRIX BY THROUGHPUT
PADD I

DIRECT SUPPLIER	MONTHLY THROUGHPUT 000 GALL) (MG/MO) ≤ 10	11-24	25-49	50-99	≥ 100	Total Outlets	%Total Outlets	%Total Outlets Offering Self-Serve(a)
MAJOR	1,150	15,300	7,940	3,120	850	28,360	47%	21%
OTHER	640	12,090	4,530	6,680	2,540	31,480	53%	29%
TOTAL OUTLETS	1,790	27,390	17,470	9,800	3,390	59,840	100%	25%
% TOTAL OUTLETS	3%	46%	29%	16%	6%	100%		
TOTAL VOLUME (MMG/YR)	150.4	6,852.8	7,756.7	8,276.1	4,474.8	27,510.8		
% TOTAL VOLUME	1%	25%	28%	30%	16%	100%		
% TOTAL OUTLETS OFFERING SELF-SERVE (a)	.7%	11%	29%	44%	81%	25%		
SELF-SERVE VOLUME (MMG/YR)	10.6	776.8	950.4	3,118.8	3,636.6	849.2		
% TOTAL SELF-SERVE VOLUME	-	9%	11%	37%	43%	100%		

(a) Percent total outlets offering a self-serve option including 8,720 total self-serve outlets and 6,450 split island (full-serve/self serve) operations.

Source: FEA, 1977 NPN Fact book, U.S. Census of Retail Trade, Lundberg letter, Industry contacts, ADL estimates.

TABLE B-3

SERVICE STATION MATRIX BY THROUGHPUT

PADD II

DIRECT SUPPLIER	MONTHLY THROUGHPUT 000 GALL) (MG/MO)					Total Outlets	%Total Outlets	%Total Outlets Offering Self-Serve(a)
	≤ 10	11-24	25-49	50-99	≥ 100			
MAJOR	1,990	13,910	6,620	3,450	530	26,500	43%	22%
OTHER	900	8,090	14,510	9,340	1,730	34,570	57%	38%
TOTAL OUTLETS	2,890	22,000	21,130	12,790	2,260	61,070	100%	31%
% TOTAL OUTLETS	5%	36%	34%	21%	4%	100%		
TOTAL VOLUME (MMG/YR)	242.8	5730.8	9381.7	10,872.8	2991.1	29,219.2		
% TOTAL VOLUME	1%	20%	32%	37%	10%	100%		
% TOTAL OUTLETS OFFERING SELF-SERVE(a)	10%	10%	33%	58%	97%	31%		
SELF-SERVE VOLUME (MMG/YR)	25.2	502.3	1,328.7	5,084.5	2,193.4	9,134.1		
% TOTAL SELF-SERVE VOLUME	-	5%	15%	56%	24%	100%		

(a) Percent total outlets offering a self-serve option including 9470 total self-serve outlets and 9520 split island (full-serve/self serve) operations.

Source: FEA, 1977 NPN Fact book, U.S. Census of Retail Trade, Lundberg letter, Industry contacts, ADL estimates

TABLE B-4
SERVICE STATION MATRIX BY THROUGHPUT

PADD III

	MONTHLY THROUGHPUT 000 GALL. (MG/MO)							
DIRECT SUPPLIER	≤ 10	11-24	25-49	50-99	≥ 100	Total Outlets	%Total Outlets	%Total Outlets Offering Self-Serve(a)
MAJOR	910	7,280	3,050	2,320	460	14,020	52%	36%
OTHER	850	6,100	3,860	1,680	390	12,880	48%	49%
TOTAL OUTLETS	1,760	13,380	6,910	4,000	850	26,900	100%	43%
% TOTAL OUTLETS	6%	50%	26%	15%	3%	100%		
TOTAL VOLUME (MMG/YR)	147.8	3,485.8	3,068.0	3,435.0	1,326.0	11,452.6		
% TOTAL VOLUME	1%	31%	27%	30%	12%	100%		
% TOTAL OUTLETS OFFERING SELF-SERVE (a)	7%	25%	54%	85%	100%	43%		
SELF-SERVE VOLUME (MMG/YR)	10.1	787.2	714.4	2,701.1	1,326.0	5,538.8		
% TOTAL SELF-SERVE VOLUME	-	14%	13%	49%	24%	100%		

(a) Percent total outlets offering a self-serve option including 6890 total self-serve outlets and 4560 split island (full-serve/self serve) operations.

Source: FEA, NPN Fact book, U.S. Census of Retail Trade, Lundberg letter, Industry contacts, ADL estimates

TABLE B-5
SERVICE STATION MATRIX BY THROUGHPUT
PADD IV

DIRECT SUPPLIER	MONTHLY THROUGHPUT 000 GALL) (MG/MO) ≤ 10	11-24	25-49	50-99	≥ 100	Total Outlets	%Total Outlets	%Total Outlets Offering Self-Serve(a)
MAJOR	120	1,090	830	110	20	2,170	34%	45%
OTHER	170	1,480	1,430	790	330	4,200	66%	70%
TOTAL OUTLETS	290	2,570	2,260	900	350	6,370	100%	61%
% TOTAL OUTLETS	5%	4%	36%	14%	5%	100%		
TOTAL VOLUME (MMG/YR)	24.4	662.0	1,003.4	752.8	462.0	2,904.6		
% TOTAL VOLUME	1%	23%	34%	26%	16%			
% TOTAL OUTLETS OFFERING SELF-SERVE (a)	10%	42%	71%	92%	100%	61%		
SELF-SERVE VOLUME (MMG/YR)	1.7	237.6	304.0	587.7	462.0	1,593.0		
% TOTAL SELF-SERVE VOLUME	-	15%	19%	37%	29%	100%		

(a) Percent total outlets offering a self-serve option including 1990 total self-serve outlets and 1910 split island (full-serve/self serve) operations.

Source: FEA, NPN Fact book, U.S. Census of Retail Trade, Lundberg letter, industry contacts, ADL estimates

TABLE B-6

SERVICE STATION MATRIX BY THROUGHPUT

PADD V

	MONTHLY THROUGHPUT 000 GALL) (MG/MO)							
DIRECT SUPPLIER	≤ 10	11-24	25-49	50-99	≥ 100	Total Outlets	%Total Outlets	%Total Outlets Offering Self-Serve(a)
MAJOR	690	5990	4,980	2,280	280	14,220	59%	33%
OTHER	680	1,320	2,990	3,500	1,500	9,990	41%	74%
TOTAL OUTLETS	1,370	7,310	7,970	5,780	1,780	24,210	100%	50%
% TOTAL OUTLETS	6%	30%	33%	24%	7%	100%		
TOTAL VOLUME (MMG/YR)	115.1	1,968.1	3,538.7	4,926.1	2,776.8	13,324.8		
% TOTAL VOLUME	1%	15%	26%	37%	21%	100%		
% TOTAL OUTLETS OFFERING SELF-SERVE (a)	5%	25%	47%	81%	100%	50%		
SELF-SERVE VOLUME (MMG/YR)	5.9	458.8	712.5	3,568.7	2,776.8	7,522.7		
% TOTAL SELF-SERVE VOLUME	-	6%	10%	47%	37%	100%		

(a) Percent total outlets offering a self-serve option including 7080 total self-serve outlets and 5050 split island (full-serve/self serve) operations.

Source: FEA, 1977 NPN Fact book, U.S. census of Retail Trade, Lundberg letters, Industry contacts, ADL estimates

APPENDIX C

SERVICE STATION SUPPLIER/OPERATIONAL PROFILES

TABLE C-1

SERVICE STATION MATRIX BY TYPE OF OPERATION

(# Outlets)

U.S.A.

	TYPE OF OPERATION					
DIRECT SUPPLIER	DIRECT OUTLETS a)	CONVENIENCE STORES	LEASEE DEALER b)	OPEN DEALER c)	TOTAL	% TOTAL
MAJOR OIL COMPANY	6,320	800	50,260	27,890	85,270	49%
REGIONAL REFINER	4,010	200	9,420	2,030	15,660	9%
INDEPENDENT MARKETER/"SUPER JOBBER"	16,630	7,560	4,510	1,100	29,800	16%
SMALL JOBBER	5,110	1,040	19,500	22,010	47,660	27%
TOTAL	32,070	9,600	83,690	53,030	178,390	100%
% TOTAL	18%	5%	47%	30%	100%	

a) Company controlled/company operated

b) Company controlled/leasee dealer

c) Dealer controlled/dealer operated

Source: 1977 NPN Fact book, FEA, Progressive Grocer, Industry contacts, ADL estimates

TABLE C-2
SERVICE STATION MATRIX BY TYPE OF OPERATION

(# Outlets)

PADD I

DIRECT SUPPLIER	TYPE OF OPERATION					
	DIRECT OUTLETS a)	CONVENIENCE STORES	LEASEE DEALER b)	OPEN DEALER c)	TOTAL	% TOTAL
MAJOR OIL COMPANY	1,590	260	15,350	11,160	28,360	47%
REGIONAL REFINER	430	20	1,010	220	1,680	3%
INDEPENDENT MARKETER/"SUPER JOBBER"	4,640	1,140	1,580	380	7,740	13%
SMALL JOBBER	2,210	180	8,820	10,850	22,060	37%
TOTAL	8,870	1,600	26,760	22,610	59,840	100%
% TOTAL	15%	2%	45%	38%	100%	

a) Company controlled/company operated

b) Company controlled/leasee dealer

c) Dealer controlled/dealer operated

Source: FEA, 1977 NPN Fact book, Progressive Grocer, Industry Contacts, ADL estimates

TABLE C-3

SERVICE STATION MATRIX BY TYPE OF OPERATION

(# Outlets)

PADD II

DIRECT SUPPLIER	TYPE OF OPERATION					
	DIRECT OUTLETS a)	CONVENIENCE STORES	LEASEE DEALER b)	OPEN DEALER c)	TOTAL	% TOTAL
MAJOR OIL COMPANY	1,750	160	18,130	6,460	26,500	43%
REGIONAL REFINER	2,620	110	6,140	1,310	10,180	17%
INDEPENDENT MARKETER/"SUPER JOBBER"	6,410	1,890	1,440	240	9,980	16%
SMALL JOBBER	1,430	150	8,130	4,700	14,410	24%
TOTAL	12,210	2,310	33,840	12,710	61,070	100%
% TOTAL	20%	4%	55%	21%	100%	

[a] Company controlled/company operated

[b] Company controlled/leasee dealer

[c] Dealer controlled/dealer operated

Source: FEA, 1977 NPN Fact book, Progressive Grocer, Industry Contacts, ADL estimates.

TABLE C-4

SERVICE STATION MATRIX BY TYPE OF OPERATION

(# Outlets)

PADD III

DIRECT SUPPLIER	TYPE OF OPERATION DIRECT OUTLETS a)	CONVENIENCE STORES	LEASEE DEALER b)	OPEN DEALER c)	TOTAL	% TOTAL
MAJOR OIL COMPANY	1,460	160	5,410	6,990	14,020	52%
REGIONAL REFINER	650	50	1,530	330	2,560	9%
INDEPENDENT MARKETER/"SUPER JOBBER"	1,770	2,430	430	110	4,740	18%
SMALL JOBBER	840	360	840	3,540	5,580	21%
TOTAL	4,720	3,000	8,210	10,970	26,900	100%
% TOTAL	17%	11%	31%	41%	100%	

a) Company controlled/company operated

b) Company controlled/leasee dealer

c) Dealer controlled/dealer operated

Source: FEA, 1977 NPN Fact book, Progressive Grocer, Industry contacts, ADL estimates.

TABLE C-5
SERVICE STATION MATRIX BY TYPE OF OPERATION

(# Outlets)

PADD IV

DIRECT SUPPLIER	TYPE OF OPERATION DIRECT OUTLETS a)	CONVENIENCE STORES	LEASEE DEALER b)	OPEN DEALER c)	TOTAL	% TOTAL
MAJOR OIL COMPANY	40	20	1,810	300	2,170	34%
REGIONAL REFINER	190	10	450	100	750	12%
INDEPENDENT MARKETER/"SUPER JOBBER"	640	590	290	140	1,660	26%
SMALL JOBBER	270	80	300	1,140	1,790	28%
TOTAL	1,140	700	2,850	1,680	6,370	100%
% TOTAL	18%	11%	45%	26%	100%	

a) Company controlled/company operated

b) Company controlled/leasee dealer

c) Dealer controlled/dealer operated

Source: FEA, 1977 NPN Fact book, Progressive Grocer, Industry Contacts, ADL estimate.

TABLE C-6

SERVICE STATION MATRIX BY TYPE OF OPERATION

(# Outlets)

PADD V

DIRECT SUPPLIER	TYPE OF OPERATION					
	DIRECT OUTLETS a)	CONVENIENCE STORES	LEASEE DEALER b)	OPEN DEALER c)	TOTAL	% TOTAL
MAJOR OIL COMPANY	1,480	200	9,560	2,980	14,220	59%
REGIONAL REFINER	120	10	290	70	490	2%
INDEPENDENT MARKETER/"SUPER JOBBER"	3,170	1,510	770	230	5,680	23%
SMALL JOBBER	360	270	1,410	1,780	3,820	16%
TOTAL	5,130	1,990	12,030	5,060	24,210	100%
% TOTAL	21%	8%	50%	21%	100%	

[a] Company controlled/company operated

[b] Company controlled/leasee dealer

[c] Dealer controlled/dealer operated

Source: FEA, 1977 NPN Fact book, Progressive Grocer, Industry contacts & ADL estimates.

APPENDIX D

"PRIVATE" GASOLINE DISPENSING OUTLETS

6 SAMPLE AQCR'S

TABLE D-1

"PRIVATE" GASOLINE DISPENSING OUTLETS

BALTIMORE AQCR

Sector/Throughput (GAL/MTH)	Number of Outlets <20M	Number of Outlets ≥20M	Number of Outlets Total	% of Total Outlets
Trucking/Agriculture Services	587	9	596	53%
Utilities/Government	246	27	273	25%
Other	247	2	249	22%
TOTAL	1,080	38	1,118	100%

Source: County Business Patterns; Local and State Agencies; Department of Commerce, Bureau of the Census.

TABLE D-2
"PRIVATE" GASOLINE DISPENSING OUTLETS

BOSTON AQCR

Sector/Throughput (GAL/MTH)	Number of Outlets <20M	Number of Outlets ≥20M	Number of Outlets Total	% of Total Outlets
Trucking/Agriculture Services	632	30	652	52%
Utilities/Government	294	6	300	24%
Other	258	33	291	24%
TOTAL	1,184	69	1,243	100%

Source: County Business Patterns; Local and State Agencies; Department of Commerce, Bureal of the Census.

TABLE D-3

"PRIVATE" GASOLINE DISPENSING OUTLETS

CHICAGO AQCR

Sector/Throughput (GAL/MTH)	Number of Outlets <20M	Number of Outlets ≥20M	Number of Outlets Total	% of Total Outlets
Trucking/Agriculture Services	1,754	69	1,823	71%
Utilities/Government	357	14	371	15%
Other	352	5	357	14%
TOTAL	2,463	88	2,551	100%

Source: County Business Patterns; Local and State Agencies; Department of Commerce, Bureau of the Census.

TABLE D-4

"PRIVATE" GASOLINE DISPENSING OUTLETS

DALLAS AQCR

Sector/Throughput (GAL/MTH)	Number of Outlets			% of Total Outlets
	<20M	≥20M	Total	
Trucking/Agriculture Services	1,034	15	1,049	54%
Utilities/Government	682	15	697	36%
Other	184	15	199	10%
TOTAL	1,900	45	1,945	100%

Source: County Business Patterns; Local and State Agencies; Department of Commerce, Bureau of the Census.

TABLE D-5

"PRIVATE" GASOLINE DISPENSING OUTLETS

DENVER AQCR

	Number of Outlets			% of Total
Sector/Throughput (GAL/MTH)	<20M	≥20M	Total	Outlets
Trucking/Agriculture Services	1,340	8	1,348	79%
Utilities/Government	157	8	165	9%
Other	189	8	197	12%
TOTAL	1,686	24	1,710	100%

Source: County Business Patterns; Local and State Agencies; Department of Commerce, Bureau of the Census.

TABLE D-6

"PRIVATE" GASOLINE DISPENSING OUTLETS

LOS ANGELES AQCR

ector/Throughput (GAL/MTH)	Number of Outlets			% of Total Outlets
	<20M	≥20M	Total	
rucking/Agriculture Services	3,640	60	3,700	61%
tilities/Government	1,271	37	1,308	22%
Other	982	87	1,069	17%
TOTAL	5,893	184	6,077	100%

Source: County Business Patterns; Local and State Agencies; Department of Commerce, Bureau of the Census.

APPENDIX E

"PRIVATE" GASOLINE DISPENSING OUTLETS

TOTAL U.S.A. AUDIT

TABLE E-1

TRUCKING/AGRICULTURE/SECTOR GASOLINE OUTLETS

	Number of Locations		Total
PAD I	<20 Gal/mth	>20 gal/mth	Outlets
Service	651	8	659
Trucking:			
Construction	2474	2	2476
For Hire	389	11	400
Forestry	36	-	36
Mining	114	-	114
Manufacturing	553	7	560
Wholesale/Retail	4623	10	4633
	8840	38	8878
Agriculture	1628	-	1628
PAD I TOTAL:	10468	38	10506
PAD II			
Service	226	20	245
Trucking:			
Construction	1593	10	1603
For Hire	251	15	266
Forestry	5	-	5
Mining	44	-	44
Manufacturing	212	20	232
Wholesale/Retail	2817	39	2856
	5148	104	5252
Agriculture	11404	-	11404
PAD II TOTAL:	16552	104	16656

Source: U.S. Bureau of Census, U.S. Dept. of Agriculture

TABLE E-1A

TRUCKING/AGRICULTURE/SECTOR GASOLINE OUTLETS

	Number of Locations		Total
	<20 Gal/mth	>20 Gal/mth	Outlets
PAD III			
Service	560	17	577
Trucking:			
Construction	829	15	844
For Hire	75	12	87
Forestry	110	3	113
Mining	124	-	124
Manufacturing	787	20	807
Wholesale/Retail	1415	24	1439
	3900	91	3991
Agriculture	12382	19	12401
PAD III TOTAL:	16282	110	16392
PAD IV			
Service	125	3	125
Trucking:			
Construction	-	-	-
For Hire	65	3	68
Forestry	24	-	24
Mining	23	-	23
Manufacturing	23	3	26
Wholesale/Retail	348	8	356
	608	18	626
Agriculture	2281	3	2284
PAD IV TOTAL:	2889	21	2910

Source: U.S. Bureau of Census, U.S. Dept. of Agriculture

TABLE E-1B

TRUCKING/AGRICULTURE/SECTOR GASOLINE OUTLETS

PAD V	Number of Locations <20 Gal/mth	Number of Locations >20 Gal/mth	Total Outlets
Service	853	10	863
Trucking:			
Construction	162	4	166
For Hire	179	5	184
Forestry	27	-	27
Mining	29	-	29
Manufacturing	186	4	190
Wholesale/Retail	1668	19	1687
	3104	42	3146
Agriculture	4888	3	4891
PAD V TOTAL:	7992	45	8037

Source: U.S. Bureau of Census, U.S. Dept. of Agriculture

TABLE E-2

TRUCKING/AGRICULTURE/SECTION GASOLINE OUTLETS

	<20 Gal/mth	>20 Gal/mth	Total Outlets
PAD I			
Utilities	3021	44	3065
Government	33866	572	34438
Military	187	62	249
	37074	678	37752
PAD II			
Utilities	3694	15	3709
Government	25606	432	26038
Military	84	56	140
	29384	503	29887
PAD III			
Utilities	1446	17	1463
Government	8260	139	8399
Military	39	26	65
	9745	182	9927
PAD IV			
Utilities	286	7	293
Government	1652	28	1680
Military	19	5	24
	1957	40	1997
PAD V			
Utilities	1026	28	1054
Government	14042	237	14279
Military	102	26	128
	15170	291	15461

Source: U.S. Dept. of Defense, FEA, ADL estimates, U.S. Bureau of Census

TABLE E-3

GASOLINE OUTLETS

	<20 Gal/mth	>20 Gal/mth	Total Outlets
PAD I			
Taxicabs	3102	139	3241
Schoolbuses	1469	61	1530
City Bus	348	3	351
Rental/Misc.	27303	53	27356
	32222	256	32478
PAD II			
Taxicabs	1229	85	1314
Schoolbuses	859	36	895
City Bus	207	2	209
Rental/Misc.	26847	51	26898
	29142	174	29316
PAD III			
Taxicabs	360	20	380
Schoolbuses	415	17	432
City Bus	151	1	152
Rental/Misc.	13222	58	13280
	14198	96	14294
PAD IV			
Taxicabs	51	3	54
Schoolbuses	75	3	78
City Bus	68	-	68
Rental/Misc.	4973	57	5030
	5167	63	5230
PAD V			
Taxicabs	352	48	400
Schoolbuses	123	5	128
City Bus	168	2	170
Rental/Misc.	11321	83	11404
	11964	138	12102

Source: Industry contacts. ADL estimates.

APPENDIX F

OUTLOOK FOR
THE SERVICE STATION POPULATION:
SELECTED PRESS REFERENCES

Self Service To Continue Market Gain

By JIM DRUMMOND

HOUSTON—The petroleum marketing scenario for the next year or so again will be entitled "Living in the Aftermath of the Arab Oil Embargo."

However, there will be two significant new subtitles: "How to Roll with President Carter's Energy Program," and "What To Do When Alaskan Oil Comes."

Although the subtitles suggest that complexities, uncertainties and nail-gnashing will increase, these things will be for sure:

- Crude and other costs will continue rising.
- Self-service will continue conquering the retail gasoline market. Predictions of help-yourself volume by the end of 1977 range as high as 70%, but most estimates are in the 30% to 40% range.
- Sharply thinner rack-to-retail margins are here to stay as the major oil companies try to offset the loss of upstream profits to nationalization and the demise of the depletion allowance.

According to the experts, margins which in some cases nearly have reached the vanishing point are one of the big legacies of the embargo.

Jobber Paul Forbes of Franklin Lake, N.J. thinks rack-to-pump spreads of 3.5 cents a gallon of gasoline will be common, with some ratios dropping even lower. A Michigan dealer operating on 2.75 cents a gallon "scares the hell out of us," Forbes said in a recent speech.

Gabriel M. Gelb, president of the Houston-based Gelb consult-

(Continued on page 26)

Source: Oil Daily 7-25-55

Self Service Rolling as Embargo Reaction Continues

(Continued from page 5)

ing group, warns that lower margins are here to stay. Unfortunately, he says, the public does not know about the extensive sacrifices the major oil companies have made to make marketing profitable.

AMONG OTHER THINGS, says Gelb, they have reduced marketing staffs, closed regional and district marketing offices, told executives to fly tourist instead of first class, and even switched to cheaper telephone systems.

Retailers will remain on the spot, even if their delicately balanced "Dealer Day in Court" bill becomes law. The trend is toward fewer service stations. The number has been reduced to about 184,000 from a 1972 nationwide peak of 225,000 and observers are looking toward an ultimate 150,000 or less.

The way to avoid the retail boneyard, of course, is to build volume or diversify into more profits. So there is a movement, not without its disappointments, into convenience, or "C" stores which sell groceries as well as pump gasoline.

Intermittent reports suggest "C" stores have been overbuilt here and there. Recently, one such area was delineated in the southeast, where an independent refiner-marketer was pictured as reverting to "mini-C's" carrying only a handful of point-of-sale items. Worse, grocery-gasoline tieups in Memphis, Tenn., and Los Angeles were accused of using motor fuel as a loss leader in violation of the law. The carnage among Memphis retailers and jobbers was said to be severe.

SUPPLIERS ARE due to hit the jackpot. They are the chief hostages to the Carter program, which contains rough spots like crude oil equalization taxes, vertical accounting, and what might be called the un-decontrol of crude. (Divestiture is reputed to have gone to an unmarked Congressional grave and is little mentioned anymore).

To problems associated with Carter will be added this year a glut of Alaskan crude on the West Coast, with unpredictable consequences in the product markets. Big companies also may want to oppose predictable moves by independent oilmen to put a clasp on imports of foreign oil, now favored by a special "entitlement." The independents object. They want to avoid becoming a balance wheel between foreign and Alaskan oil producers and having to sell less at lower prices.

Perhaps the suppliers' greatest cornucopia may be provided, however, by the exponential flowering of federal and state bureaucracies. Just look at the goodies that rate likely or possible:

- Manganese additives may be barred from gasoline and lead phased down faster than deemed feasible. The consequence, says Senior Vice President C.R. Sitter of Exxon CO. USA, might have to be an octane reduction to the point where some 10 million cars that now perform satisfactorily would experience significant engine knock.

- Distillates may be recontrolled when the Federal Energy Administration has digested testimony at an Aug. 2 hearing in Washington, D.C., to determine whether prices exceeded federal guidelines for last winter. There is also a chance gasoline will not be deregulated Oct. 1 as scheduled unless a recontrol "trigger" more sensitive than the one for distillates is devised.

- Although now excluded, oil marketing conceivably might be subjected to an Occupational Health & Safety Administration proposal which would reduce benzene in the industrial atmosphere to a one-millionth-part whiff.

- Mounting credit costs have prompted cash sales experiments by Exxon and Mobil and left majors and independents alike with a dilemma. If they throw out credit cards, they may throw out 25% to 35% of their businesses. One suggested solution: Dual credit-cash pricing.

- Some gasoline prices could be forced down as much as three cents a gallon if the Federal Energy Administration disallows a gasoline "tilt" which permits suppliers to assign a disproportionate share of costs to that product. General price-cutting could result.

- A growing number of legislatures, oblivious to the Capitol Hill wake for divestiture, are sawing off marketing from refining. Copies of a Maryland law upheld by a U.S. appellate court were requested by 40 states. Delaware and the District of Columbia have joined Maryland in passing divestiture bills; similar legislation is being considered in nine other states, six in the Northeast.

- Sell-outs, mergers and liquidations arising from regulations, inflation and other difficulties reflected by a lackluster stock market are expected to gain momentum. Takeover attempts sparked by such fabulously profitable liquidations as that of Apco Oil Co. (more than $200 million gross compared with a stock takeover price of something more than $80 million) are likely to keep corporate managements dodging.

Some future problems do not apply to the whole marketing segment, just parts of it.

SMALL REFINER SUBSIDIES, which affect products markets, have been attacked by a round-robin of majors as excessive. According to Exxon's Sitter, they amount to around $1 billion a year. Senior Vice President Annon Card of Texaco Inc. said his company's Billings, Mont., refinery is being undersold by about six cents a gallon of gasoline. He described its Amarillo and El Paso refineries as "in trouble," noting they are small enough to have been subsidized if owned by an independent company.

Texaco recently refused to comment on a rumor it might close several small U.S. refineries because of the subsidy. Incidentally, Card indicated he and his colleagues henceforth will pay more attention to the bottom line than the the honor marketing in 50 states.

A proposal by FEA to change the base period for gasoline allocations was dropped because of opposition from much of the industry. Backing had come chiefly from big companies which, for the most part, asked for a rolling, or continuously updated, base period tied, perhaps, to the previous

(Continued on next page)

year's volume. Many marketers, including most independents, had wanted either hands-off present rules or stipulations, like increased allocations from 1972 suppliers, that would prevent refiners from retaining more product.

A number of fuel oil jobbers have taken up cudgels against Carter program elements they feel are pointed at them. They fault the program for forcing conversion from heating oils to coal, promoting construction of coal gasification plants, and handing control of home insulation to state public utility commissions. PUC's are considered closely allied to public utilities, which many oil merchants have fought tooth and nail.

FAR AND AWAY marketing's biggest trend, the swing toward self-service, is accompanied by what might be called the giantization of service stations. Today's super-station pumps 200,000 gallons of gasoline a month or more and costs $250,000 to $300,000. Price tags have ranged as high as $1 million, the outlay for a Las Vegas, Nev., unit said to be doing more than 500,000 gallons of monthly business.

How to get into the "Super" category is a problem money alone might not be able to solve. According to a midwestern authority, converting a conventional station usually is not the way. Special driveway configurations not necessarily envisioned by earlier planners are needed. In fact, it sometimes may be desirable to raze and rebuild a successful "super" so it will become even more successful.

Self-service volumes also seem to be affected to geography. A midwestern major found, for instance, nearly half to three-quarters of its Rocky Mountain customers helped themselves. In the midwest, however, the proportion was only 10% to 25%.

THE "SELF SERVE" map is looking better and better. Latest states to lower the bars to help-yourself selling are Illinois and North Dakota. Only Oregon and New Jersey still hold out.

Low margins are the bane of independent marketers who are fighting for survival and may be changing their opinions of other issues facing the petroleum industry.

According to Forbes, the New Jersey jobber, his current prediction that supplier-to-street gasoline spreads of 3.5 cents a gallon will be common was revised downward from nine cents only two years ago.

President Jack Griffity of Oklahoma Oil Marketers Association asserted recently that resellers are beginning to fear their suppliers "more than they fear bureaucratic controls." He cited a poll showing that OOMA members once solidly in favor of decontrol had swung to opposite viewpoints. Some of their reasons, besides the margin situation were said to include "severe competition from direct marketing by refiner-suppliers, lower than tankwagon prices at supplier-operated service stations, and changes in supplier credit terms and station rentals.

So-called "economic rents" in which suppliers hungry for marketing profits would recapture the asserted true value of their outlets have raised hackles in many, but not all, areas. Dealers whose profits are increasing do not seem to mind as much as the others.

MINOR TRENDS that may or may not point to something big include the reappearance of once-ubiquitous trading stamps at a number of Southwestern service stations.

Do-it-yourself repair services at retail products outlets appear to be prospering. Naturally, the number is increasing.

State gasoline taxes are going up. Increases have been made or threatened recently in Nebraska, Arkansas and Louisiana.

Marketing acquisitions proliferate. One of 1977's largest was the purchase by Choker Oil, 50% owned by Marathon, of 213 former Enco service stations in Illinois, Michigan, Indiana and Wisconsin for some $15 million. Exxon Co. USA, which never penetrated regional markets to its liking, reportedly will supply its former outlets with products to be sold under the Oklahoma flag.

Over the whole marketing scene brood the twin specters of feast and famine. At the moment U.S. gasoline inventories, in the words of an independent refiner-marketer, are "very adequate;" the retail market, "horribly sloppy." One popular explanation is over-enthusiastic forecasts of demand, which was supposed to leap 5% to 7% this summer above like-date figures for 1976. A recent assessment of the actual increase is 2.6.

SOME SUPPLIERS have marked down gasoline lately. A Gulf Oil Corp. cut which, according to a spokesman, was in line with cost pass-through regulations of FEA sparked rumors some suppliers were running out of unrecovered, or banked costs, which may be added, while they last, to federally controlled prices.

Yet the latest FEA compilation of the gasoline cost "bank," for April, showed an abnormally large $1.085 billion pot still awaiting distribution.

Indirect results of the gasoline pileup are heavier trading in distillates, filling pipeline gaps left by a decline in motor fuel transactions, and a large surplus of foreign crude oil swinging at anchor off the U.S. coast or jamming transshipment terminals. The desire for distillates seems to have something to do with last winter's weather

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API Report: Fewer Stations Are Being Closed

While the number of service stations being deactivated by leading oil companies is still running on the high side—better than 5,000 a year—the pace is slowing down significantly.

Reports from 24 companies polled by American Petroleum Institute's division of marketing indicated they eliminated 5,182 outlets in 1975. That total, however, is 44.5% below 1973's peak of 9,342 shutdowns, and 26.9% below last year's 7,091.

At the same time, new construction showed a slight improvement.

Outlets built from the ground up in 1975 totaled 212, up 17.7% from 1974's figure of 180. But that is far off from the 1,000 to 2,000 a year that had been maintained prior to the shortage days of 1973. That was the big turning point in new construction—downward.

Service Station Gains and Losses in 1975*

	1975	1974**	1973	1972	Total since 1968
Deactivations	5,182	7,091	9,342	3,498	36,883
New stations built	212	180	1,177	1,689	11,574
Net change	-4,970	6,911	-8,165	-1,809	-25,309

Definitions:

Deactivations: Stations where equipment and identification have been removed and where reopening as a service station is no longer contemplated.

New construction: Stations built on vacant land and/or are new on the site. Does not include complete rebuilds.

Service stations: Retail outlets where more than 50% of the dollar volume comes from the sale of gasoline and related products.

*Reports received by API from 24 companies in 1975; earlier years involved from 23 to as few as 18 companies.

**1974 figures were revised by API in the 1975 report.

API's Brice Cecil made it plain that the data in the division's latest report is not industrywide, they are only trends. He pointed out that replies were received from 24 companies in 1975, not all of whom participated in past surveys. In 1974 and 1973, 23 companies responded, and in the earlier years, only 18 companies. Thus there are many annual variables.

Notably absent from the 1975 poll were Texaco and Amerada Hess.

Participants in 1975 were American Petrofina of Texas, Amoco, Ashland Petroleum, Atlantic Richfield, Cities Service, Continental, Diamond Shamrock, Exxon USA, Getty, Gulf Oil-US, Marathon, Mobil, Murphy, Pasco Marketing, Phillips Petroleum, Shell, Skelly, Standard of California, Standard of Ohio, J.D. Streett & Co., Sun, Tenneco Petroleum, Union Oil of California, and Vickers Petroleum.

Since 1968, when API made its first report, participants in the studies have reported a grand total of 36,883 deactivations and 11,574 new stations. That's better than a two to one ratio for shutdowns.

Deactivations hit their peak in 1973 when the Arab oil embargo precipitated product shortages and marginal stations were pruned vigorously by majors and independents alike.

Current service station population is estimated at 190,000, down 16% from 1972's record high of 226,000. Projections by many authorities indicate this total will be decreased even further in the years ahead, possibly to as low as 150,000 by 1980.

Source: NPN 8/76

Is Station Count Falling Drastically?

A large-scale fallout of service stations is either underway, or on the verge of happening, some industry sources believe.

A marketing research expert in the Midcontinent area says the eventual toll could be as high as 25%.

Another veteran marketing executive, told about the forecast, expressed surprise at the number. But he wouldn't say yes or no as to its probable accuracy.

"What you really have to determine, if a fallout of such dimensions is underway, is whether the closings are temporary or permanent. That could make a big difference in the long run."

American Petroleum Institute's annual survey of service-station deactivations, while still incomplete at this time, indicates the tides of closures are still running strong. API said, however, that it has not yet received sufficient replies in its current survey to cite specific numbers.

Since 1968, however--the first year the API survey was made--deactivations have been averaging around 4,500 a year. Biggest year was in 1973 when more than 9,300 stations were eliminated by 23 companies from the scene.

190,000 Stations

A recent count of service stations by Lundberg Letter Inc. and NPN placed the number of outlets at 190,869 as of Dec. 31, 1975.

This would be comparable with, albeit a bit higher, than the figures used by U.S. Department of Commerce whose "Franchising in the Economy, 1974-76," calculated the total at 189,400.

Looking ahead, Commerce Department anticipates that this total will be decreased further, to 189,000 by next Dec. 31.

But the Midcontinent researcher who suggested that a fallout is imminent or already underway says his best estimate right now is 181,000 stations.

That's the lowest number anyone has come up with yet.

If his 25% forecast proves to be accurate, or even halfway correct, it would mean that the service-station population will deteriorate to about 150,000 or 160,000 over the next year or two--a far cry from 1972's peak of 226,000.

It would also mean--assuming that 190,000 was a reasonable count of stations in business as of last Dec. 31—that up to 9,000 outlets have fallen by the wayside in the first four months of the current year.

Dollars Are Up

Even though the number of stations is declining sharply, gross sales dollars are not. To the contrary, they are moving up rapidly per station and for the industry as a whole.

Commerce Department's franchising report estimates the average station took in $233,000 in 1975. It believes this gross will increase to $255,000 per station in 1976.

On the basis of the 1975 average, it would appear that the 190,869 stations in the Lundberg/NPN count grossed more than $44.3-billion in 1975.

That is an increase of 32% over the department's 1972 report which put gross sales at $33.6-billion.

Assuming that the 1976 average of $255,000 per station happens that way, and the number of stations drops no lower than 189,000, the 1976 gross would be about $48-billion.

(NPN's 1975 Factbook Issue just off the press gives a state-by-state breakdown of the service-station population, based on the Lundberg/NPN calculations. It also provides gross sales estimates based on the Commerce Department average.) **N-F**

Source: NPN 6/76

10

THE OIL DAILY, Tuesday, December 2, 1975

Service Station Population Decline Forecast by Business School Professor

BLOOMINGTON, Ind. — Treat your corner service station owner kindly, he may not be around much longer.

Dr. James M. Patterson, of the I.U. School of Business, said there will be a radical decline in "station population" in the next few years because of major shifts in oil marketing strategies.

Patterson spoke before a group of two dozen educators and marketing authorities attending a two-day conference on structure, strategy and performance sponsored by the E.W. Kelley Chair in the I.U. School of Business.

"From a high of 226,000 branded retail stations in 1972, the number fell to 193,000 last year," Patterson said. "The total number should decline to between 150,000 and 160,000 by 1980."

THE BASIC PROBLEM facing the oil companies now, Patterson said, is how to develop new marketing strategies which adequately reflect the realities of the new marketing structure. How are profits to be generated in a "near static market?"

"As the profit generating role of crude changes, and with increases in crude consumption generally opposed by public policies, profit growth must increasingly come from refining and marketing — from more efficient operations and higher prices and margins. Marketing now must make money on its own," he said.

"One of the most wasteful aspects of gasoline marketing has been the practice of over-stationing," Patterson explained. "So long as gasoline marketing was subservient to profitable crude sales, this was not terribly critical — especially if high retailing costs were shares by independent dealers."

Low volume stations are not only a losing proposition in their own right, Patterson said, but they are a drag on all other stations. Many would have been closed under any circumstances, but the recent period of product shortages and allocations meant that stations could be closed without dramatic shifts in market shares.

AS AVERAGE STATION volume increases, however, there will be a re-thinking of the way stations are operated.

"When gasoline retailing was treated as a break-even operation, the heavy reliance on dealers made good sense. Now serious questions arise. Many high volume stations are just too profitable for dealer operations. The rewards to the dealer are way out of line with his contribution. Increasingly, these prime stations will be converted to other forms of operation as the law and circumstances permit."

Patterson also predicted a radical shift in the mix of retail operations.

"There will be considerably less emphasis on the traditional full-service operations, and much greater emphasis given to the fast serve, less-service and self-service type of operation.

"Tie-in operations with convenience stores, dairy stores, car-care centers, tire stores, car washes and the like will also grow as new forms of retailing are sought to justify high priced locations and quality management."

Patterson said food marketers, general merchandise firms and others will assume new roles in gasoline retailing.

THE OIL DAILY, Monday, July 28, 1975

VIEW FROM THE MARKETING ARENA:

Four Stations at Every Corner: Good-Bye and Good Riddance!

By JACK R. URICH PhD
President
UCO Oil Company

THE OIL DAILY asked me for a short article on West Coast marketing. There are plenty of marketing men available to comment on price and supply, so I decided to confine my remarks to a pheonmenon which surfaced in this industry after the oil embargo. To my knowledge no writer has seen fit to examine this trend. I refer to the massive closing of service stations on the West Coast, and what appears to be the trend nationwide.

Knowledgeable marketers have pointed out for years that the service station industry was overbuilt — some said by 300%.

This state of affairs grew out of a building race fired by the twin fallacies of "market penetration" and "market position."

Market penetration is a philosophy which requires that a branded service station be within sight at all times for fear the customer may otherwise tear up his credit card. Market position refers to total gallons sold by each major and each's respective position on the volume ladder.

ANY INDEPENDENT could have pointed out that neither theory had any validity. But it was supply shortage, not logic, that forced the closing of marginal units. And as the crisis eased, marketers learned they could sell more product through fewer stations at higher profit per gallon.

Since all companies were in the same boat, the relative positions of competitors remained approximately the same, with the result that everyone made more money with less overhead. As a matter of fact, most companies have increased not only profit but total sales while operating fewer units.

The magic number for across-the-board phase out appears to be 30%. There has been no rush by independents to snap up padlocked stations and accordingly the majority appear scheduled for demolition.

This process is being speeded in certain areas, particularly the San Francisco Bay Area, where some municipalities have ordinances requiring that closed stations be demolished at the expense of the owner after six months or one year as the case may be.

THERE IS NO consensus but from random conversations with major companies the timetable for these spin-offs appears to be five years.

The net result is that in about five years there will be 30% fewer units in the United States while gasoline demand over the same period will increase between 5% and 10%.

Grade school arithmetic indicates that stations in the future will double the volume done in the past.

Industry thinking appears to be that, as use permits become more difficult to get, the future trend will be toward larger stations, beautification, high volume with less service, and that such locations will have high value.

One far-reaching effect will be an overall drop in the value of prime corners. There will be more land than McDonald's drive-ins and the good Kentucky Colonel can absorb.

From where I sit the service station building race appears to be at an end. Marketing people have been taught a lesson. The dollar quota has replaced market penetration and marketing position as the measuring rod for management. The new philosophy makes sense.

Jobber-Retailers At Crossroads

Monterey conferees hear advocates of aggressive retailing posture rebutted by champion of wholesale only tradition.

Jobbers who have been functioning as jobber-retailers, and traditional jobbers still bucking the crossover into retailing, all had their business appetites whetted at the 18th Annual Meeting of the California Automotive Wholesalers Assn. (CAWA).

"The Jobber In The Future" themed the September meeting, held this year in Monterey, California.

The general session program was a two-parter; the first, a series of addresses by key industry observers, followed by a three-hour panel discussion with audience participation invited.

Laying it squarely on the line for the packed audience, O. Temple Sloan, Jr., president of General Parts, Inc., a WD, claimed that as he saw it, there is no such thing as a traditional aftermarket. "The only thing traditional about it, is that it will change," he said.

Sketching the potential of the aftermarket, Sloan projected a 150 million vehicle population (cars, trucks, busses) by 1980, "a phenomenal growth in the light truck market", and introduction of over 30,000 new part numbers in the next four years.

With 35% of all jobbers now belonging to one marketing program or another, the speaker predicted the jobbing establishment is in a good position to compete with Sears, Wards, K mart and other merchandising giants.

Sloan stated the mass merchandisers are limited to easy-to-install consolidated parts, and aren't interested in complex parts repair.

"They don't want to hear the consumer's complaint, and can't afford the inventory investment," he said.

Sloan told the gathered CAWA members they must manage their financial assets if they are to cope with the tremendous investment required "to maintain our supreme position."

Another speaker, Don Midgely, director of distributor sales, Champion Spark Plug Co., while not specifically urging that the traditionalists put out the welcome mat for retail trade, nonetheless threw down some juicy facts for doing so.

Midgely noted that by 1983, 20.4 million motorcycles will be registered, plus an additional 3.5 million off-road bikes.

"These machines eat spark plugs like little kids eat candy. It's easy for a bike to use as many plugs as the family auto in a year," he said.

Other spark plug and related merchandise potential mentioned, included the existing 45 million power lawn mowers, which will jump to more than 64 million units in seven years. Small garden tractors and tillers (presently numbering 19 million units) will hit over 41 million units by 1983.

According to Midgely, that will mean "105 million sales opportunities just lying around the house."

The afternoon panel discussion was spirited as well as enlightening.

In his opening remarks, panelist

Irving Krantzman, chairman of the board, Grand Auto, and president of Super G Warehouse, a sister WD operation, chided the jobbing fraternity for its lack of aggressiveness.

Krantzman's penchant for frankness opened some eyes wide. He said he is constantly looking for market places that will enable him to buy more, sell more and make money in between. And he doesn't care who he sells to do it.

Does that mean he would sell retailer as well as jobber? "Yes! I'd sell those guys. And if you think these big guys—these manufacturers—won't cheat, then you ought to come to my buying office and see them standing around." With that remark, Krantzman received the closest thing to a standing ovation.

Panelist Jack Law, owner of Law's Auto Parts, predicted a great future for the jobber, especially those in suburban communities which he termed "the backbone of the industry."

Law contended jobbers can perform both wholesale and retail functions. "It all depends on whether you want to make the necessary adjustments."

Ten years ago Law's store rang up 85% of its business with wholesale, and 15% with retail. Now, 70% of the volume is walk-in retail trade.

Our wholesale customers know it takes them and retail sales for us to make a go of it," said the jobber-retailer.

Law felt jobbers must be affiliated with a buying group. "It's very difficult to be independent."

Louis Parrillo, western zone manager, Dana Corp., emphasized that only the jobbers would survive who are aware of a rapidly changing market, and who adapt to the needs of that market.

He placed total automotive repair volume in the area of $60 billion, and anticipated it would be $80 billion in four years.

Parrillo mentioned changes which will affect jobbers major customer groups.

In four years, he said, the number of service stations will decline another 25%. Traditionally, these customers have accounted for 25% of jobbers sales volume. The figure may drop to 15% however, by 1980, with service stations relying more on the oil companies for parts needs.

Although repair specialists, such as tune-up outlets, are increasing dramatically, "in general they tend to rely on their own internal distribution system", and that, according to Parrillo, could mean a dwindled market for the jobber.

Machine shops, he maintained, are a key opportunity to recoup losses, and are an entre into getting service work from mass merchandisers. Every dollar spent in shop labor generates $3-$5 in related parts sales, said the panelist.

A marked dissenter on the panel was Al Joseph, president, Hunter Publishing Co., publishers of Jobber and Warehouse Executive magazine. Joseph has long been a staunch opponent of the jobber-retailer syndrome.

He told the audience he has no quarrel with anyone who wants to become a retailer. "But what has confused this industry—and the confusion starts right at the top with manufacturers, and carefully nurtured by some trade associations—is that if you want to be a retailer, be one, and if you want to be a wholesaler, be one, too."

Joseph called attention to the fact that for years there were some 15,000 jobbers, but the number spiraled about ten years ago, and that the last census put it at 27,000. "But we know tht many of these outlets aren't jobbers in the traditional sense."

He minced no words, contending the jobbing industry is "engaging in a self-fulfilling prophecy, not of doom, but of chaos; to which daily opportunism contributes, from too many factories on down."

APPENDIX G

SUMMARY OF GASOLINE BANKED COSTS

Banked Costs - Gasoline - Source: FEA 8/77*

Under current FEA price regulations, the maximum allowable price which a refiner may charge for refined products is generally equal to his May 1973 prices plus increases in his crude and purchased product costs and certain allowable nonproduct price increases. If a refiner charges a price lower than the allowable maximum, he can put the amount of unrecovered costs into a "bank." These banked costs may be used in subsequent months to maintain or raise his selling price up to his legal maximum if the market place allows. Certain limits have been placed on the use of the motor gasoline banks. Under regulations adopted in February 1976, to implement certain provisions of the EPCA, an individual refiner generally may not raise prices by more than enough to reduce the total motor gasoline bank in any one month by more than 10 percent of the total amount of unrecouped increased costs calculated for all covered products as of January 31, 1976, or any month thereafter. The refiner may reallocate his banked costs accumulated for the other covered products into the bank for motor gasoline. During July 1976, additional rule changes provided refiners greater motor gasoline pricing flexibility by permitting the equal application rule to be applied on a regional basis.

*Preliminary findings and views concerning the exemption of motor gasoline from the mandatory petroleum allocation and price regulations - August 1977

The existence of banked costs for refiners would indicate generally that they are not charging as high a price as the regulations would permit. Thus, actual prices would be market-clearing prices where supply equals demand. When ceiling prices are higher than the market prices, then the elimination of the pricing regulations which establishes the price ceilings should have no effect on market prices, since competitive forces are sufficient to keep them below maximum lawful levels. Of course, this does not mean that no individual sellers' price would ever rise as a consequence of decontrol, but only that weighted average prices should not rise as a result of decontrol.

Preliminary data indicate that in April 1977, the total gasoline bank for the top 30 refiners who account for 85 percent of domestic gasoline sales, was $1,017 million. This figure tends to understate the extent to which market prices for motor gasoline are below maximum allowable prices for individual refiners because refiners can reallocate product costs increases and banked costs from other products still subject to price control to motor gasoline when computing maximum allowable gasoline prices. The total top 30 refiners' bank for all products was over $1.5 billion in April 1977. To the extent that these banks have not subsequently been used up, these costs represent another source for allowable motor gasoline price increases which have not been fully utilized by all refiners.

A potential or immediate problem, however may exist for some of these refiners. A small number of large refiners are currently being constrained by FEA's pricing regulations below levels of other large refiners. Based on April data, three of the top 30 gasoline refiners were out of banks. June survey data indicates that retail prices of the three constrained refiners had increased from January levels by 0.3 to 0.5 cent per gallon less than the increases in the prices of the unconstrained refiners. If motor gasoline is decontrolled, the three refiners can be expected to raise prices to the level of prices for the unconstrained refiners. The impact on the average market price from these three refiners is estimated to be quite small (less than one half cent per gallon) since these three refiners account for less than one-fifth of the gasoline market.

APPENDIX H

VAPOR RECOVERY COSTS
PROVIDED BY
THE EPA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

October 20, 1977

Mr. Paul E. Mawn
Arthur D. Little, Inc.
Acorn Park
Cambridge, Massachusetts 02140

Dear Paul:

I have enclosed a discussion and tables outlining EPA's estimates of costs for vapor control systems at service stations. The bases for EPA's estimates are presented so one can determine what is included in the costs. These estimates result from an analysis of cost data furnished by oil companies, equipment vendors, and various other sources.

Sincerely yours,

Kenneth H. Lloyd

Kenneth H. Lloyd
Economic Analysis Branch
Strategies and Air Standards Division

Enclosure

COSTS FOR ALTERNATIVE VAPOR CONTROL SYSTEMS AT SERVICE STATIONS

Since vapor recovery systems for service stations are undergoing continual development and refinement, it is difficult to predict exact capital and operating costs for the systems once they are installed on a wide-scale basis. The costs for processing units, which are now only in prototype use, are uncertain and can only be estimated by vendors based on expected production levels. In addition, the installation costs for the systems depend upon a variety of factors, including the number of dispensers and islands, configuration of underground piping and types of dispensers. However, while the exact costs of the systems will vary depending upon local circumstances, the relative costs of the systems should remain consistent.

Table H-1 presents EPA's estimates of installed capital and annual operating and maintenance costs for three vapor recovery systems, based on the number of nozzles per station. This analysis considers only the three most advanced vapor control systems--the vapor balance system, the aspirator assist (hybrid) system, and the vacuum assist system with an incinerator as the processing unit. Furthermore, the costs include control of emissions from filling underground storage tanks (Stage I) and from vehicle refueling (Stage II).

The bases for the capital cost estimates are presented in Table H-2. These estimates result from EPA's analysis of cost data furnished by oil companies which have already installed the equipment in many localities, equipment vendors, and state agencies. The piping costs include manifolded piping for the balance and vacuum assist systems and non-manifolded piping for the aspirator system since the latter requires separate return lines to each tank. For the balance system, the nozzle cost reflects that for a no-seal/no-flow nozzle. In addition, the balance system estimate includes the cost for a blockage sensor device. While Federal regulations do not require such a device, it is required under California regulations and may be mandated by other State or local agencies. Finally, the processing unit for the vacuum assist system is estimated to cost $4,000 with an installation cost of $700.

Table H-3 estimates the capital costs for Stage I control alone utilizing the balance system. These costs will vary depending upon how much trenching, backfilling, and paving is required. If Stage I is installed in conjunction with Stage II piping, the costs allocable to Stage I include essentially only the hardware costs since the trenching, backfilling and paving is required for Stage II in any case.

Finally, the bases for the annual operating and maintenance costs are presented in Table H-4. Nozzle maintenance will vary among the systems because of the complexity of the nozzles. The balance system will require more nozzle maintenance because of the many parts of the no-seal/no-flow nozzle, but this maintenance cost should be the only O & M cost associated with the system. The vacuum assist system, on the other hand, involves less nozzle maintenance but requires maintenance of the processing unit and blowers as well as electrical power to operate the system.

To partially offset these costs, the implementation of Stage I and II controls will result in a net savings of gasoline for the service station owner. Based on material balance calculations, 9.2 pounds of gasoline will be recovered per 1000 gallons dispensed. This savings results from the fact that Stage I and II create a closed system which prevents working losses from the underground tanks. Vapors displaced to the underground tank from the fueling of automobiles saturate the vapor space of the tank, preventing the creation of vapors resulting from the filling and drainage of the tanks. This savings is directly attributable to the service station owner since vapors created in the uncontrolled case remain as liquid with Stage I and II controls. On the other hand, the vapors which are displaced from the automobile to the underground tanks are eventually returned to the bulk terminal by the balanced tank trucks. These recovered vapors, which amount to about eight pounds per 1000 gallons dispensed, do not represent a direct savings for the station owner since the bulk terminal processes the vapors. Furthermore, no recovery credit results for the station owner from the installation of Stage I control alone since recovered vapors are returned to the bulk terminal.

TABLE H-1

COSTS FOR ALTERNATIVE VAPOR CONTROL SYSTEMS
(Stages I and II)

Number of Nozzles	Balance		Aspirator Assist		Vacuum Assist	
	Capital Cost[1]	Annual O&M[2]	Capital Cost[1]	Annual O&M[2]	Capital Cost[1]	Annual O&M[2]
2	$4,300	$120	$5,800	$120	$8,700	$425
3	4,500	180	6,100	165	8,900	460
6	6,300	360	8,300	300	10,600	550
8	7,400	480	9,600	390	11,600	620
9	7,900	540	10,100	435	12,000	650
10	8,300	600	10,700	480	12,400	675
12	9,600	720	12,200	570	13,600	750
15	11,200	900	14,000	705	15,000	840
16	11,600	960	14,600	750	15,400	875

[1] Does not include cost for testing since it is not known what type of test will be required. Proposed EPA Stage II regulations require only a short test, which will cost about $50 per station. A longer, more exhaustive test would cost around $1000 per station.

[2] Does not include annualized capital charges, which should be based on a 10 year life and an appropriate rate of interest. Does not include credit for recovered vapors, which is 9.2 pounds per 1000 gallons throughput.

TABLE H-2

BASES FOR CAPITAL COST ESTIMATES FOR ALTERNATIVE VAPOR CONTROL SYSTEMS
(Stages I & II, 9 Dispensers, 3 Islands, 3 Tanks)

	Balance	Aspirator Assist	Vacuum Assist
Piping	3500	4000	3500
Installation (Trenching, paving, etc.)	2000	2000	2000
Subtotal	5500	6000	5500
Nozzles, hoses, fittings	1500	1300	750
Dispenser Components			
ITT valve, flame arrestor, etc.			1050
Aspirator (incl. installation and auxiliaries)		2800	
Blockage sensor	900		
Processing Unit (incl. installation)	——	——	4700
TOTAL	7900	10,100	12,000

Sources: Data supplied to EPA by oil companies (ARCO, Exxon, Gulf, Mobil, Shell, Sunmark), equipment vendors (Red Jacket, Hasstech), and California Air Resources Board

TABLE H-3

BASES FOR CAPITAL COST ESTIMATES FOR STAGE I VAPOR RECOVERY BALANCE SYSTEM

Hardware (drop tubes, vent valves, etc.)	$200/tank
Installation (depends on how much pavement has to be removed and replaced)	$900/station

Sources: Data supplied to EPA by oil companies and equipment vendors.

TABLE H-4

BASES FOR ANNUAL OPERATING AND MAINTENANCE COSTS FOR ALTERNATIVE VAPOR CONTROL SYSTEMS

	Balance	Aspirator Assist	Vacuum Assist
Nozzle Maintenance			
Replacement (rebuilt nozzle)	$30/N	$30/N	$25/N
Faceplate/Boot Repair	$30/N	$15/N	--
System Maintenance	--	One annual service call @ $30/call	4.5% of processing unit investment plus 6 service calls @ $30/call.
Power	--	--	1.4 kwh/1000 gals. throughput

Source: EPA estimate based on data supplied by nozzle manufacturers and equipment vendors.

APPENDIX I

THE IMPACT OF VAPOR RECOVERY CREDIT ON SERVICE STATION ECONOMICS

GASOLINE VAPOR CREDIT WITH VAPOR RECOVERY SYSTEMS

EPA requested that we apply a vapor recovery system credit to the service station profit centers which is equivalent to 9.2 lbs. of gasoline per 1000 gallons of gasoline throughput. The theoretical rationale for this credit is that saturated vapors in the underground storage tank will reduce the rate of volatility of gasoline by this amount when the tank is being emptied. The credit is therefore given to the amount of extra liquid gasoline which can be sold by the dealer which would normally be vaporized under current operating practices. However, all of the vapors generated while offloading the tank truck and those returned to underground storage from the pump island are taken back to the supplier's terminal by the tank truck and are not credited to the service station.

If it is assumed that the average gasoline API gravity is equal to 57, then 1.47 gallons of gasoline are retained by the dealer with vapor recovery systems for every 1000 gallons pumped. As shown in Attachment I, this is equal to a net credit of return vapors of $.0009/gallon for all of the prototype cases.

With a total annual retail gasoline volume of 84.4 billion gallons, vapor recovery systems will result in at least 124.3 million gallons remaining as liquid for sale by the dealer at service stations (i.e., 3 MBD). Assuming an average pump posting of $.6200/gallon (including tax), this credit would have a value of $77 MM per year which equals 65% to 84% of the annual vapor recovery cash operating costs (i.e., depending on the system). Additional credit for vapor recovery would also be credited to the wholesale supplier for gasoline vapors returned to their terminal which are recondensed back to liquid.

Source: EPA Petroleum Section CPB 9/30/77 - Recovery credits attributable to balance systems at service stations.

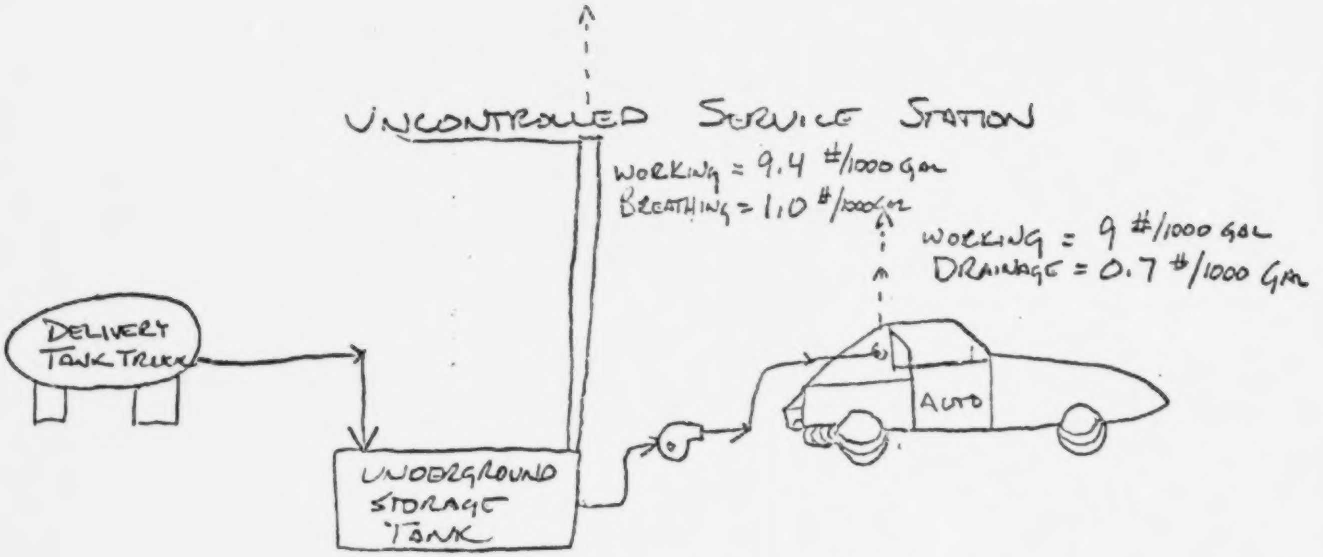
VAPOR RECOVERY GASOLINE CREDIT

ATTACHMENT I

TYPE STATION	FACTOR/VOLUME	LOW	MIDDLE	HIGH
Leasee	Thruput (000 GPM)	20	35	80
	Pump Posting Inc. Tax ($/Gal)	.6507	.6407	.6187
	Annual Vapor Savings (Gals)	353	618	1414
	Monthly Vapor Credit ($)	19	33	73
	Unit Vapor Credit ($/Gal)	.000958	.000944	.000911
Direct Major	Thruput (000 GPM)	50	100	150
	Posting ($/Gal)	.6107	.6107	.6107
	Annual Savings (Gal)	884	1768	2651
	Monthly Credit ($)	45	90	135
	Unit Credit ($/Gal)	.000899	.000899	.000899
Direct Indep.	Thruput (000 GPM)	100	150	200
	Posting ($/Gal)	.5994	.5823	.5793
	Annual Savings (Gal)	1768	2651	3535
	Monthly Credit ($)	88	128	171
	Unit ($/Gal)	.000883	.000858	.000853
Open	Thruput (000 GPM)	10	30	50
	Posting ($/Gal)	.6507	.6407	.6187
	Annual Savings (Gal)	177	530	883
	Monthly Credit ($)	10	28	46
	Unit ($/Gal)	.000944	.000844	.000911
"C" Store	Thruput (000 GPM)	10	20	35
	Posting ($/Gal)	.5793	.5793	.5793
	Annual Savings (Gal)	176	353	619
	Monthly Credit ($)	9	17	30
	Unit ($/Gal)	.000853	.000853	.000853

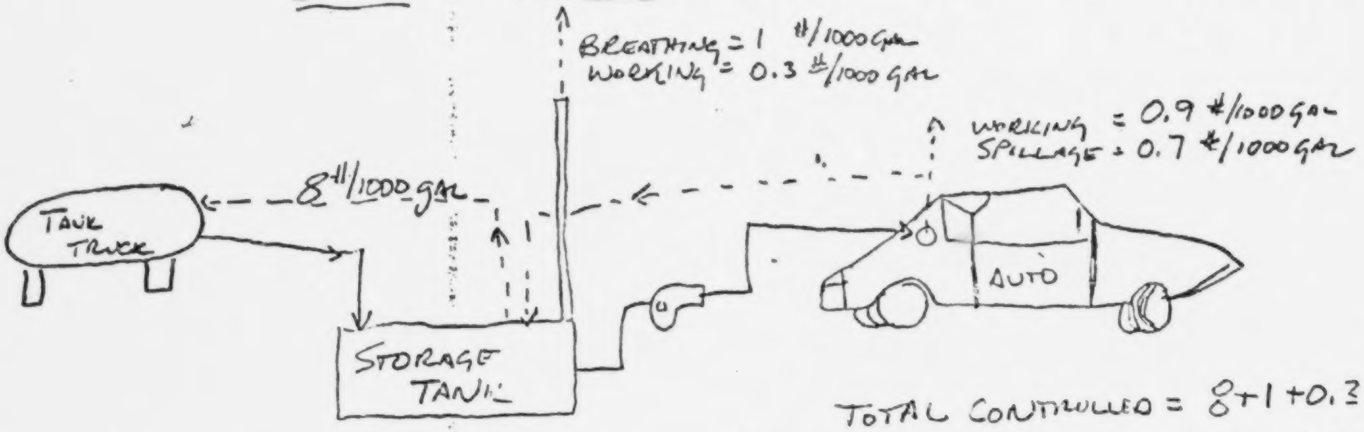
9/21/77

UNCONTROLLED SERVICE STATION



TOTAL UNCONTROLLED = 9.4 + 1.0 + 9 + 0.7 = 20.

BALANCE SYSTEM



TOTAL CONTROLLED = 8 + 1 + 0.3 + 0.9 + 0.7 = 1

TOTAL CREDIT = UNCONTROLLED − BALANCE = 20.1 − 10.9 = 9.2 #/1000 GAL

APPENDIX J

SERVICE STATION PROTOTYPES

OPERATIONAL AND ECONOMIC PROFILES

Reproduced from best available copy.

TABLE J-1

COMPANY INVESTMENT/LEASEE DEALER SERVICE STATION PROTOTYPE (LEASEE DEALER)

PRO FORMA INCOME STATEMENT

I. OPERATING PROFILE			
Throughput (000 Gallons/Mo)	20	35	80
Type of Operation	Leasee	Leasee	Leasee
Type of Service	Full	Full	Split Islan
Supplier Investment⁺ ($000)	145	165	225
Year of Construction	1967	1967	1972
Number of Nozzles	6	8	10
Number of Employees (Incl. Dealer and Mechanic)	3	4	5.5
• Number of Mechanics	0	1	1
Dealer Investment ($000)	10	20	35
II. NET REVENUE⁺ ($/Gallon)			
Composite Pump Price (Ex. Tax)	.5257	.5157	.4937
Composite Dealer Tank Wagon (Ex. Tax)	.4376	.4376	.4376
Gasoline Gross Margin	.0881	.0781	.0561
Non-gasoline Contribution Margin	.1000	.0820	.0554
Total Station Gross Margin	.1881	.1601	.1115
III. OPERATING EXPENSES⁺			
Labor			
• Dealer Draw⁺⁺	.0500	.0285	.0125
• Employees	.0748	.0556	.0397
Utilities and Services	.0213	.0149	.0088
Rent	.0225	.0200	.0180
Miscellaneous	.0400	.0363	.0260
Total Expenses	.2086	.1553	.1050
Net Margin (BFIT)	(.0205)	.0048	.0065
Dealer ROI (BFIT)	Negative	10%	18%

⁺ Onsite only with the individual station viewed as a separate profit center.

⁺⁺ Effective Dealer Annual Income

Throughput (000 GPM)	Draw ($000)	Net Margin ($000)	Total Take Home ($000)
20	12	(5)	7
35	12	2	14
80	12	6	18

Source: ADL estimates, industry contacts, misc. trade publications

TABLE J-2

COMPANY INVESTMENT/LEASEE DEALER SERVICE STATION PROTOTYPE (DIRECT OUTLET)

MAJOR OIL COMPANY

PRO FORMA INCOME STATEMENT

I. OPERATING PROFILE			
Throughput (000 Gallons/Mo)	50	100	150
Type of Operation	Direct	Direct	Direct
Type of Service	Self Serve	Self Serve	Self Serve
Supplier Investment[+] (000)	170	200	200
Year of Construction	1974	1974	1974
Number of Nozzles	10	12	14
Number of Employees	2.3	3.3	3.3
Hours Open per Day	12	16	16
II. NET REVENUES[+] ($/Gallon)			
Composite Pump Price (Ex. Tax)	.4857	.4857	.4857
Laid-in Gasoline Costs (Ex. Tax)	.4376	.4376	.4376
Gasoline Gross Margin	.0481	.0481	.0481
Non-Gasoline Sales Gross Margin	.0050	.0040	.0030
Total Onsite Gross Margin	.0531	.0521	.0511
III. OPERATING EXPENSES[+]			
Labor	.0331	.0198	.0133
Utilities & Services	.0102	.0051	.0047
Miscellaneous	.0300	.0250	.0191
Total Expenses	.0733	.0499	.0371
Net Margin (BFIT)	(.0202)	.0022	.0140
Station[+] ROI (BFIT)	Negative	1%	13%

[+] Onsite only with the individual station viewed as a separate profit center.

Source: ADL estimates, industry contacts, misc. trade publications.

TABLE J-3

COMPANY INVESTMENT/LEASEE DEALER SERVICE STATION PROTOTYPE (OPEN DEALER)

PRO FORMA INCOME STATEMENT

I. OPERATIONAL PROFILE			
Throughput (000 Gallons/Mo)	10	30	50
Type of Operation	Open	Open	Open
Type of Service	Full	Full	Split Island
Supplier Investment ($000)	2	2	3
Dealer Investment ($000)	40	65	120
Number of Nozzles	4	6	8
Total Employment (Inc. Dealer and Mechanics)	1.5	3.0	4.0
• Number of Mechanics	0	0	1
II. NET REVENUE ($/Gal)			
Composite Pump Posting (Ex. Tax)	.5257	.5157	.4937
Composite DTW (Ex. Tax)	.4226	.4226	.4226
Average Gross Margin	.1031	.0931	.0711
Non-Gasoline Gross Margin	.0800	.0650	.0600
Total Site Gross Margin	.1831	.1581	.1311
III. OPERATING EXPENSES ($/Gallon)			
Labor			
• Dealer +	.1000	.0333	.0200
• Employees	.0374	.0498	.0449
Utilities and Services	.0425	.0142	.0085
Rent	-	-	-
Miscellaneous	.0200	.0463	.0400
Total Expenses	.1999	.1436	.1134
Net Margin (BFIT)	(.0168)	.0145	.0177
Dealer ROI (BFIT)	Negative	7%	9%

+ Effective Dealer Annual Income

	$000		
Throughput (000 GPM)	Draw	Net Margin	Total
10	12	(2)	10
30	12	5	17
50	12	11	23

Source: ADL estimates, industry contacts, misc. trade publications

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TABLE J-4

COMPANY INVESTMENT/LEASED DEALER SERVICE STATION PROTOTYPE (DIRECT OUTLET)

UNBRANDED/INDEPENDENT MARKETER

PRO FORMA INCOME STATEMENT

I. OPERATING PROFILE			
Throughput (000 Gallons/Mo)	100	150	[illegible]
Type of Operation	Co/Co	Co/Co	[illegible]
Type of Service	Total Self Service	Total Self Service	[illegible]
Supplier Investment* ($000)	136	141	[illegible]
Year of Construction	1974	1974	[illegible]
Number of Nozzles	12	14	16
Number of Employees	3.3	3.3	[illegible]
Hours Open per Day	16	16	[illegible]
II NET REVENUES+ ($/Gallon)			
Composite Pump Price (Ex. Tax)	$.4543	$.4543	[illegible]
Laid-in Gasoline Costs (Ex. Tax)	.4173	.4173	[illegible]
Gasoline Gross Margin	.0370	.0370	[illegible]
Non-Gasoline Sales Gross Margin	.0040	.0020	[illegible]
Total Onsite Gross Margin	$.0416	$.0390	[illegible]
III. OPERATING EXPENSES+			
Labor	$.0182	$.0121	$.0116
Utilities & Maintenance	.0051	.0047	.0035
Miscellaneous (overhead, inc. depreciation, etc.)	.0210	.0160	.0140
Total Expenses	$.0443	$.0318	$.0294
Net Margin (BFIT)	(.0033)	$.0072	$.0085
Station+ ROI (BFIT)	Negative	9%	14%

+ Onsite only with the individual station viewed as a separate profit center.

* This investment reflects an estimate of current independent marketer direct outlets which consist of the following: improvements to existing site - land - working capital and inventory (average 10 M gallons). A brand new grass roots self service location with electronic pumps and controls with high traffic density and good access would cost over $250 M/unit.

Source: ADL estimates, industry contacts, misc. trade publications.

TABLE J-5

"C" Store[**] SERVICE STATIONS PROTOTYPE

PRO FORMA INCOME STATEMENT

I. OPERATIONAL PROFILE			
Throughput (000 Gallons/Mo.)	10	20	35
Type of Operation	"C" Store	"C" Store	"C" Store
Type of Service	Self Serve	Self Serve	Self Serve
Supplier Investment[+] ($000)	19	20	22
Year of "C" Store Conversion	1976	1975	1976
Number of Nozzles	2	2	3
Number of Employees	0.3	0.3	0.3
II. NET REVENUE (Gasoline Only)[+] ($/Gallon)			
Composite Pump Posting (Ex. Tax)	.4543	.4543	.4543
"Laid-in" Gasoline Cost (Ex. Tax)	.4173	.4173	.4173
Gasoline Gross Margin	.0370	.0370	.0370
Non-Gasoline Gross Margin[+]	.0000	.0000	.0000
Total Gasoline Gross Margin	.0370	.0370	.0370
III. OPERATING EXPENSES[+] ($/Gallon)			
Labor[*]	.0035	.0035	.0035
Utilities and Services	.0050	.0025	.0010
Rent	-	-	-
Miscellaneous	.0205	.0160	.0092
Total Expenses	.0290	.0220	.0137
Net Margin (BFIT)	.0080	.0150	.0233
Gasoline ROI (BFIT)[+]	5%	18%	44%

---

[*] Fixed fee/gallon commission paid to store for dual use of store clerk to handle gasoline payments.

[**] Convenience Store

[+] Onsite only with the individual station viewed as a separate profit center.

Source: ADL estimates, industry contacts, misc. trade publications.

APPENDIX K

VAPOR RECOVERY CAPITAL INVESTMENT

BY

RETAIL GASOLINE MARKETING SEGMENT

TABLE K-1

VAPOR RECOVERY CAPITAL REQUIREMENTS

SEGMENT - MAJOR OIL COMPANIES

TYPE OUTLET	DIRECT	LESSEE	"C" STORE	TOTAL $000
# of Service Station Outlets	6320	50260	800	
# of Nozzles/"Typical" Station	12	8	3	
# of Tanks/"Typical" Station	4	4	3	
Stage I only Investment ($000)	10744	40208	1200	52152
Stage I + Stage II Cost				
Balance System ($000)				
Investment	60672	371924	3600	436196
Operating Expenses	4550	24125	144	28819
Vacuum Assist ($000)				
Investment	85952	583016	7120	676088
Operating Expenses	4740	31161	368	36269

Source: EPA, (Appendix H), ADL Estimates

TABLE K-2

VAPOR RECOVERY CAPITAL REQUIREMENTS

SEGMENT - REGIONAL REFINERS

TYPE OUTLET	DIRECT	LESSEE	"C" STORE	TOTAL $000
# of Service Station Outlets	4010	9420	200	13630
# of Nozzles/"Typical" Station	12	8	3	
# of Tanks/"Typical" Station	4	4	3	
Stage I only Investment ($000)	6817	16014	300	23251
Stage I + Stage II Cost				
Balance System ($000)				
Investment	38496	69708	900	109104
Operating Expenses	2887	4522	36	7445
Vacuum Assist ($000)				
Investment	54536	109272	1780	165588
Operating Expenses	3008	5840	92	8940

Source: EPA, (Appendix H), ADL Estimates

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TABLE K-3

VAPOR RECOVERY CAPITAL REQUIREMENTS

SEGMENT - SUPER JOBBER/MARKETER-WHOLESALERS

TYPE OUTLET	DIRECT	LESSEE	"C" STORE	TOTAL $000
# of Service Station Outlets	16630	7560	4510	28700
# of Nozzles/"Typical" Station	15	8	2	
# of Tanks /"Typical" Station	4	4	2	
Stage I only Investment ($000)	28271	12852	5863	46986
Stage I + Stage II Cost				
Balance System ($000)				
Investment	187919	55944	19393	263256
Operating Expenses	14967	3629	541	19137
Vacuum Assist ($000)				
Investment	249450	87696	39237	376383
Operating Expenses	13969	4687	5863	24519

Source: EPA, (Appendix H), ADL Estimates

TABLE K-4

VAPOR RECOVERY CAPITAL REQUIREMENTS

SEGMENT - SMALL JOBBERS

TYPE OUTLET	DIRECT	LESSEE	"C" STORE	TOTAL $000
# of Service Station Outlets	5110	19500	1040	25650
# of Nozzles/"Typical" Station	12	8	2	
# of Tanks /"Typical" Station	4	4	2	
Stage I only Investment ($000)	8687	33150	1352	43189
Stage I + Stage II Cost				
Balance System ($000)				
Investment	49056	144300	4472	197828
Operating Expenses	3679	9360	125	13614
Vacuum Assist ($000)				
Investment	69496	226200	9048	304744
Operating Expenses	3833	12090	442	16365

Source: EPA, (Appendix H), ADL Estimates

TABLE K-5

VAPOR RECOVERY CAPITAL REQUIREMENTS

SEGMENT - OPEN DEALERS

TYPE OUTLET	MAJOR	REG. REFINER	SUPER JOBBER	SMALL JOBBER	TOTAL
# of Service Station Outlets	27890	2030	1100	22010	53030
# of Nozzles	8	8	6	6	
# of Tanks	4	4	4	4	
Stage I only Investment ($000)	47413	3451	1870	37417	90151
Stage I + Stage II Cost					
Balance System ($000)					
Investment	206386	15022	6930	138663	367001
Operating Expenses	13387	974	395	7924	22681
Vacuum Assist ($000)					
Investment	323524	23548	11660	233306	592038
Operating Expenses	17292	1259	605	13646	32802

APPENDIX L

INDEPENDENT MARKETER PROTOTYPE COMPANIES OPERATIONAL AND FINANCIAL PROFILES

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TABLE L-1

LARGE INDEPENDENT MARKETER/WHOLESALER PROTOTYPE

I OPERATIONAL PROFILE

- Annual Sales - 249 MM Gal (17 MBD)

Product Mix

	Distillate		Gasoline		Residual Oil	
	Direct	Whse.	Direct	Whse.	Whse.	Total
MM Gal/Yr	27	10	131	50	31	249

Retail Operations

a) Service Stations

	Company Investment Direct Salary/ Company Operated	Company "Owned"/Leasee Dealer	Open Dealer	Total
# Outlets	50	80	30	160
Average Throughput (000/GPM	100	35	20	

b) # Retail Oil Heat Customers - 15,000

Terminals - 1 Primary Terminal With 400 M BBL of Storage

Truck Fleet - 15 Tank Wagons (4 M each), 12 Tank Trucks (8 M each)

Market Area - 3 or 4 States

II FINANCIAL SUMMARY

	$MM
Annual Sales Realization	106.0
Gross Margin	10.1
Net Income (BFIT)	1.5
Fixed Assets	13.0
Working Capital	8.1
Total Investment	21.1
Net Worth	5.2
Return on Investment (BFIT)	7.1%
Return on Equity (BFIT)	28.4%

TABLE L-1 (Contd.)

TYPE SYSTEM VAPOR RECOVERY IMPACT	ITEM	BALANCE BALANCE $000	VACUUM ASSIST $000
Average Nozzles/Station	9		
Average Tanks/Station	4		
Stage I and Stage II Investment Required		1027.2	1508
Post Vapor Recovery Total Investment		22127.0	22608
Vapor Recovery Operating Expenses		70.2	80.6
Post Vapor Recovery Net Margin - (BFIT)		1429.8	1419.4
Post Vapor Recovery Return on Investment		6.5%	6.3%
Post Vapor Recovery Return on Equity		27.1%	26.8%
Vapor Recovery Investment as a % of Total Investment		4.9%	7.1%
Vapor Recovery Investment as a % of Net Worth		19.4%	28.5%

SOURCE: ADL Estimates, Industry Contact, EPA (Appendix H)

TABLE L-2

BALANCE SHEET

INDEPENDENT MARKETER/WHOLESALER

Current Assets	$000	
Cash	3851	
Inventory	1796	
Accounts Receivable	2437	
Total		8084

Fixed Assets	Gross $000	Net $000
Buildings	600	500
Loading Racks	400	360
Tankage, Piping	2750	2062
Fleets	1430	953
Service Stations	20060	8675
Land	500	500
Total	25740	13050
Total Assets	33824	21134

Current Liabilities	7716
Long Term Debt	8134
Share Holders Equity (Net Worth)	5284
Total Net Worth - Liabilities	21134

SOURCE: ADL Estimates

TABLE L-3

INDEPENDENT MARKETER PROTOTYPE ("SUPER JOBBER")

I OPERATIONAL PROFILE

Annual Sales - 153 MM Gal (10 MBD)

Service Stations - 85

Type of Operations - Direct Salary "Investment"/ Supplier Operated (Total Self Service)

Average Volume/Station - 150 M Gal/Month

Terminals - None (Rack Buyer)

Truck Fleet - None (Uses Common Carrier Contract Haulers)

Market Area - 2 or 3 States

II FINANCIAL SUMMARY

	$000
Annual Sales Realization	69,967
Gross Margin	6,426
Net Income (BFIT)	918
Fixed Assets	10,800
Working Capital	5,015
Total Investment	15,815
Net Worth	5,377
Return on Investment (BFIT)	5.8%
Return on Equity (BFIT)	17.1%

TABLE L-3 (Contd.)

VAPOR RECOVERY IMPACT	ITEM	BALANCE $000	VACUUM ASSIST $000
Average Nozzles/Station	12		
Average Tanks/Station	4		
Stage I and Stage II Investment Required		816	1156
Post Vapor Recovery Total Investment		16631	16971
Vapor Recovery Operating Expenses		61.2	63.8
Post Vapor Recovery Net Margin - (BFIT)		857	854
Post Vapor Recovery Return on Investment		5.2%	5.0%
Post Vapor Recovery Return on Equity		15.9%	15.8%
Vapor Recovery Investment as a % of Total Investment (Pre Vapor Recovery)		5.2%	7.3%
Vapor Recovery Investment as a % of Equity		15.2%	21.5%

SOURCE: ADL Estimates, Industry Contacts, EPA (Appendix H)

TABLE L-4

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BALANCE SHEET - "SUPER JOBBER"

	Net Assets $000
Current Assets	
Cash	$1,700
Accounts Receivable	595
Inventories	2,380
Other Current Assets	340
Total Current Assets	5,015
Net Property, Plant, and Equipment	10,800
Total Assets	$15,815
Current Liabilities	$ 5,266
Long-Term Debt	5,172
Stockholders' Equity	5,377
Total Liability and Stockholders' Equity	$15,815

SOURCE: ADL Estimates

TABLE L-5

"TYPICAL" BRANDED JOBBER PROTOTYPE

I OPERATIONAL PROFILE

Annual Sales - 2580 M Gal

Service Stations - 8

Type Service Operations -

	Direct Salary-Company Investment/ Company Operated	Company "Investment" /Leasee Dealer	Open Dealer
# Outlets	2	5	1
Average Volume/Station - (000/ GPM)	50	35	15

Facilities - 1 bulk plant (40 M gallons of storage). A Rack buyer at supplier's primary terminal.

Truck Fleet - 1 tank truck (8 M Gal) 1 tank wagon (4 M gallons)

Market Area - 1 state (3 or 4 counties)

II FINANCIAL SUMMARY

	$ 000
Annual Sales Realization (Ex Tax)	1134
Gross Margin	90
Net Income (BFIT)	44
Fixed Assets	408
Working Capital	74
Total Investment	482
Net Worth	205
Return on Investment (BFIT)	9.1%
Return on Equity (BFIT)	21.5%

TABLE L-5 (Contd.)

VAPOR RECOVERY IMPACT	ITEM	BALANCE $000	VACUUM ASSIST $000
Average Nozzles/Station	6		
Average Tanks/Station	4		
Stage I and Stage II (Branded) Investment Required		44	74
Post Vapor Recovery Total Investment		526	556
Vapor Recovery Operating Expenses		2.5	3.9
Post Vapor Recovery Net Margin - (BFIT)		41.5	40.1
Post Vapor Recovery Return on Investment		7.4%	7.2%
Post Vapor Recovery Return on Equity		20.2%	19.6%
Vapor Recovery Investment as a % of Total Investment (Pre Vapor Recovery)		9%	15%
Vapor Recovery Investment as a % of Equity		21.5%	36%

SOURCE: ADL Estimates, Industry Contacts, Petroleum Marketing Education Foundation, NOJC, EPA (Appendix H).

TABLE L-6

BALANCE SHEET - BRANDED JOBBER

Current Assets	$000
Cash	57
Accounts Receivable	12
Inventory	5
Total C/A	74

Fixed Assets	$000	
	Gross	Net
Service Stations	630	348
Trucks	105	50
Bulk Plant	25	10
Total	760	408
Total Assets		482

	$000	
Current Liabilities	168	
Long Term Debt	109	
Stockholders Equity (Net Worth)	205	
Total Liability & Stockholder Equity		482

SOURCE: ADL Estimates, Petroleum Marketing Education Foundation

TABLE L-7

DEALER "OWNED"/DEALER OPERATOR PROTOTYPE (OPEN DEALER)

I OPERATIONAL PROFILE

Annual Sales - 300 M Gal

# Service Stations - 1

Type of Operations - Full service (Dealer "Investment"/Dealer Operated

Average Volume/Station - 25 M Gal/Month

Terminals - None. Buys on a delivered basis

Truck Fleet - None

Market Area - 1 location most likely in a rural or older suburban area

II FINANCIAL SUMMARY	$000
Annual Sales Realization	144.3
Gross Margin	39.3
Net Income (BFIT)	7.6
Fixed Assets	80.0
Working Capital	23.7
Total Investment	103.7
Net Worth	50.0
Return on Investment (BFIT)	7.4%
Return on Equity (BFIT)	15.2%

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TABLE L-7 (Contd.)

III. VAPOR RECOVERY IMPACT	ITEM	BALANCE $000	VACUUM ASSIST $000
Average Nozzles/Station	6		
Average Tanks/Station	4		
Stage I and Stage II (Branded) Investment Required		6.3	10.6
Post Vapor Recovery Total Investment		110.0	114.3
Vapor Recovery Operating Expenses		.36	.55
Post Vapor Recovery Net Margin - (BFIT)		7.24	7.05
Post Vapor Recovery Return on Investment		6%	6.2%
Post Vapor Recovery Return on Equity		14.5%	14.1%
Vapor Recovery Investment as a % of Total Investment (Pre Vapor Recovery)		6.1%	10.2%
Vapor Recovery Investment as a % of Equity		12.6%	21.2%

SOURCE: ADL Estimates, Industry Contacts

TABLE L-8

OPEN DEALER SERVICE STATION PROTOTYPE

PRO FORMA INCOME STATEMENT

I. OPERATIONAL PROFILE

Throughput (000 Gallons/Mo)	25
Type of Operation	Open Dealer
Type of Service	full
Supplier Investment ($000)	2
Dealer Investment ($000)	104
Number of Nozzles	6
Total Employment (Inc. Dealer and Mechanics)	2.5
• Number of Mechanics	0

II. NET REVENUE
($/Gal)

Composite Pump Posting (Ex. Tax)	.4810
Composite DTW (Ex. Tax)	.4210
Average Gross Margin	.0610
Non-Gasoline Gross Margin	.0700
Total Site Gross Margin	.1310

III. OPERATING EXPENSES
($/Gallon)

Labor	
• Dealer	.0400
• Employees	.0320
Utilities and Services	.0200
Rent	-
Miscellaneous	.0135
Total Expenses	.1055
Net Margin (BFIT)	.0255
Dealer ROI (BFIT)	7.4%

SOURCE: ADL Estimates; Industry Contacts, Misc. trade publications

TABLE L-9

BALANCE SHEET - OPEN DEALER

			Net Assets
Current Assets			
Cash			$ 9,500
Inventories			10,700
Accounts Receivable			2,500
Other			1,000
Total Current Assets			$ 23,700
Fixed Assets			
Land	$65,000		
Equipment	10,000		
Improvements	65,000		
Total Assets		$140,000	
Less Depreciation		60,000	
Total Fixed Assets			80,000
Total Assets			$103,700
Current Liabilities			
Accounts Payable			$ 6,000
Other			2,500
Total Current Liabilities			$ 8,500
Long-Term Debt			45,200
Stockholders' Equity			50,000
Total Liabilities and Stockholders Equity			$103,700

SOURCE: ADL Estimates

APPENDIX M

CORPORATE PROTOTYPE FINANCIAL RATIOS

TABLE M-1
TYPICAL LARGE INDEPENDENT MARKETER/WHOLESALER

	PRESENT ($000)	VAPOR RECOVERY ADJUSTMENTS ($000)	POST VAPOR RECOVERY $000 PRO FORMA
Current Assets	$ 8,084		
Net Fixed Assets	13,050	(+) 1,027	(1) $14,077
Total Assets	$21,134		$22,161
Current Liabilities	$ 7,716		$ 7,716
Long Term Debt	8,134	(+) 1,027	9,161
Total Debt	$15,850	(+) 1,027	$16,877
Equity	5,284		5,284
Total Liabilities	$21,134		$22,161
RATIOS			
Total Debt/Equity	2.99		3.19
Net Fixed/Equity	2.46		2.66
Term Debt/Net Fixed	.62		.65
Current Ratio	1.05		1.05

Annual Sales Realization	$106,100	
Net profit pre-tax	1,500	
Adjustments - Post Vapor Recovery		
- 1st year interest at 10% on additional debt of $1,027,000		(-) 102
- Added vapor recovery operating expenses		(-) 70
Adjusted Net Profit (BFIT) - No pass through of vapor recovery costs		1328
Net Margin (BFIT) % Total Sales	1.41	1.25

(1) Vapor installation cost of $7,900 per station x 130 stations.

SOURCE: ADL Estimates, Industry Contacts

TABLE M-2

TYPICAL "SUPER" JOBBER

	PRESENT ($000)	VAPOR RECOVERY ADJUSTMENTS ($000)	$000 POST VAPOR RECOVERY PRO-FORMA
Current Assets	$ 5,015		
Net Fixed Assets	10,800	(+) $816 (1)	$11,616
Total Assets	$15,815		$16,631
Current Liabilities	$ 5,266		$ 5,266
Long Term Debt	5,172	(+) $816 (1)	5,988
Total Debt	$10,438	(+) $816	$ 11,254
Equity	5,377		5,377
Total Liabilities	$15,815		$ 16,631
RATIOS:			
Total Debt/Equity	1.94		2.09
Net Fixed/Equity	2.01		2.09
Term Debt/Net Fixed	.48		.52
Current Ratio	.95		.95

Annual Sales Realization	$69,967	
Net profit pre-tax	918	
Adjustments - Post Vapor Recovery		
- 1st year interest @ 10% on additional debt of $816,000		
- Added vapor recovery operating expenses		(-) 81.6
Adjusted pre-tax profit		(-) 61.2
		775.2
Profit (BFIT) % Total Sales - 1.31%		1.10%

---

(1) Vapor installation cost of $9,600 per station x 85 stations.

SOURCE: ADL Estimates, Industry Contacts

TABLE M-3
TYPICAL BRANDED JOBBER

	PRESENT($000)	$000 VAPOR RECOVERY ADJUSTMENTS		$000 POST VAPOR RECOVERY PRO FORMA
Current Assets	$ 74			
Net Fixed Assets	408	(+) 44	(1)	$452
Total Assets	$482			$526
Current Liabilities	$168			$168
Long Term Debt	109	(+) 44		153
Total Debt	$277	(+) 44		$321
Equity	205			205
Total Liabilities	$482			$526
RATIOS:				
Total Debt/Equity	1.35			1.56
Net Fixed/Equity	1.99			2.20
Term Debt/Net Fixed	.27			.34
Current Ratio	2.87			2.87

Annual Sales Realization	$1,134	
Net profit pre-tax	44	
Adjustments - Post Vapor Recovery		
- 1st year interest @ 10% on additional debt of $44,000		(-) 4.4
- Added vapor recovery operating expenses		2.5
Adjusted pre-tax profit - No pass through of vapor recovery costs		37.1
Adjusted net profit (BFIT) % Total Sales	3.88%	3.27%

(1) Vapor installation cost of $6,300 per station x 8 stations.

SOURCE: ADL Estimates, Industry Contacts

TABLE M-4
TYPICAL DEALER OWNER/OPERATOR

	PRESENT	VAPOR RECOVERY ADJUSTMENTS	POST VAPOR RECOVERY PRO FORMA
Current Assets	$ 23,700		
Net Fixed Assets	80,000	(+) 6,300 (1)	$ 86,300
Total Assets	$103,700		110,000
Current Liabilities	$ 8,500		$ 8,500
Long-Term Debt	45,200	(+) 6,300	51,500
Total Debt	$ 53,700	(+) 6,300	$ 60,000
Equity	50,000		
Total Liabilities	$103,700		110,000

RATIOS:

	PRESENT	POST VAPOR RECOVERY PRO FORMA
Total Debt/Equity	1.07	1.20
Net Fixed/Equity	1.6	1.7
Term Debt/Net Fixed	.57	.60
Current Ratio:	2.78	2.78

Annual Volume	$144,300		
Net profit pre-tax	7,600		
Adjustments - Post Vapor Recovery			
1st year interest @ 10% on additional debt of		(-)	630
- Added vapor recovery operating expenses		(-)	360
Adjusted pre-tax - no pass through of vapor recovery costs			6610
Adjusted net profit (BFIT) % Total Sales	5.3%		4.6%

(1) Vapor installation cost of $6,300 per station.

SOURCE: ADL Estimates, Industry Contacts

APPENDIX N

PRO FORMA ANALYSIS OF CASH FLOW AVAILABLE TO SERVICE ANNUAL DEBT AFTER VAPOR RECOVERY

TABLE N-1
CASH FLOW WORKSHEET

B. "Super"Jobber

		$/year	
Present term debt,	$5,172,000 ÷ 10 =	517,200	
New term debt,	816,000 ÷ 5 =	163,200	
Total Debt		680,400	
Pre-tax Profit		918,000	
Adjustment for new debt of $816,000 @ 10%		81,600	
Less vapor recovery operating expenses		61,200	
Adjusted net profit (BFIT)		775,200	
Tax @ 50%		387,600	
Adjusted Net Profit (AFT)		387,600	
Present Depreciation	$720,000		
New Equipment @ 7 yrs.	116,500		
Total Depreciation		836,500	
Estimated Cash Flow		1224.1	
Ratio of debt/cash flow			56%

Source: ADL Estimates

TABLE N-2
CASH FLOW WORKSHEET

A. Large Independent		$/year	
Present term debt,	$8.134 ÷ 10* =	$813,400	
New term debt,	1.027 ÷ 5 =	205,400	
Total Debt		1,018,800	
Pre-tax Profit		1,500,000	
Adjustment for new debt of $1,027,000 @ 10%		102,700	
Less vapor recovery operating expenses		70,200	
Adjusted net profit (BFIT)		1,327,100	
Tax @ 50%		663,550	
Adjusted Net Profit (AFT)		663,550	
Present Depreciation	$866,600		
New Equipment @ 7 yrs.	147,000	1,013,600	
Total Depreciation			
Estimated Cash Flow		1,677,150	
Ratio of debt/cash flow			61%

*Estimate of debt on balance sheet

Source: ADL Estimates

TABLE N-3
CASH FLOW WORKSHEET

C. Branded Jobber		$/year
Present term debt,	$109,000 ÷ 10 =	10,900
New term debt,	44,000 ÷ 5 =	8,800
Total Debt		19,700
Pre-tax Profit		44,000
Adjustment for new debt of $44,000 @ 10%		4,400
Less vapor recovery operating expenses		2,500
Adjusted net profit (BFIT)		37,100
Tax @ 50%		18,550
Adjusted Net Profit (AFT)		18,550
Present Depreciation	$27,200	
New Equipment @ 7 yrs.	6,280	
Total Depreciation		33,500
Estimated Cash Flow		52,050
Ratio of debt/cash flow		38%

Source: ADL Estimates

TABLE N-4

D. Dealer Owned/Operated		$/year	
Present term debt,	$45,200 ÷ 10 =	4,500	
New term debt,	6,300 ÷ 5 =	1,260	
Total Debt		5,760	
Pre-tax Profit		7,600	
Adjustment for new debt of $6,300 @ 10%		630	
Less vapor recovery operating expenses		360	
Adjusted net profit (BFIT)		6,610	
Tax @ 50%		1,653	
Adjusted Net Profit (AFT)		4,957	
Present Depreciation	$5,300		
New Equipment @ 7 yrs.	900		
Total Depreciation		6,200	
Estimated Cash Flow		11,157	
Ratio of debt/cash flow			52%

Source: ADL Estimates

APPENDIX O

ECONOMIC IMPACT WORKSHEETS

TABLE O-1
COMPANY INVESTMENT/LESSEE DEALER OPERATION
($)

	Low Volume	Medium Volume	High Volume
Vapor Recovery Investment			
-- Vapor Balance	6,300	7,900	8,300
-- Vacuum Assist	10,600	11,600	12,400
Vapor Recovery O&M Costs			
-- Vapor Balance	360	480	600
-- Vacuum Assist	550	620	675
Annualized Investment Charge: 20.7% of Initial Investment Costs			
-- Vapor Balance	1,304	1,635	1,718
-- Vacuum Assist	2,194	2,401	2,567
Total Annual Vapor Recovery Costs			
-- Vapor Balance	1,664	2,115	2,318
-- Vacuum Assist	2,744	3,021	3,242
Recovery Credit			
-- Vapor Balance	230	396	875
Net Annual Vapor Recovery Cost			
-- Vapor Balance	1,434	1,719	1,443
-- Vacuum Assist	2,514	2,625	2,367
Net Vapor Recovery Cost in Cents Per Gallon			
-- Vapor Balance	.0060	.0041	.0015
-- Vacuum Assist	.0105	.0063	.0025

SOURCE: ADL Estimates, EPA (Appendices H & I)

TABLE O-1 (Contd.)

	Low Volume	Medium Volume	High Volume
PRE-VAPOR RECOVERY ECONOMICS			
Net Margin (BFIT)	(.0205)	.0048	.0065
Multiply by Annual Gallonage	240,000	420,000	960,000
Total Contribution (BFIT)	(4,920)	2,016	6,240
Dealer Investment	$10,000	$20,000	$35,000
Required Capital Recovery	1,080	2,160	3,780
Surplus (Deficit) of Total Contribution Over Required Contribution	(6,000)	(144)	2,460
COSTS OF VAPOR RECOVERY			
-- Vapor Balance	1,434	1,719	1,443
-- Vacuum Assist	2,514	2,625	2,367
PASSED ON COSTS*			
-- Vapor Balance	792	1,386	768
-- Vacuum Assist	1,320	2,310	1,152
NET CHANGE IN CONTRIBUTION			
-- Vapor Balance	(642)	(333)	(675)
-- Vacuum Assist	(1,194)	(315)	(1,215)

* At $0.0033/0.0055 per gallon for Vapor Balance/Vacuum Assisted in Low and Medium Volume operations which are in Low Volume Sector of the market; and $.0008/.0012 for the High Volume operation which is in the High Volume Sector.

SOURCE: ADL Estimates, EPA (Appendices H and I).

TABLE O-2

DIRECT/MAJOR TOTAL SELF SERVICE OPERATION
(dollars)

	Low Volume	Medium Volume	High Volume
Vapor Recovery Investment			
-- Vapor Balance	8,300	9,600	10,800
-- Vacuum Assist	12,400	13,600	14,600
Vapor Recovery O&M Costs			
-- Vapor Balance	600	720	840
-- Vacuum Assist	675	750	810
Annualized Investment Charge: 20.7% of Initial Investment Costs			
-- Vapor Balance	1,718	1,987	2,236
-- Vacuum Assist	2,567	2,815	3,022
Total Annual Vapor Recovery Costs			
-- Vapor Balance	2,318	2,707	3,076
-- Vacuum Assist	3,242	3,565	3,832
Recovery Credit			
-- Vapor Balance	540	1,080	1,620
Net Annual Vapor Recovery Cost			
-- Vapor Balance	1,778	1,627	1,456
-- Vacuum Assist	2,702	2,485	2,212
Net Vapor Recovery Cost in Cents Per Gallon			
-- Vapor Balance	.0030	.0014	.0008
-- Vacuum Assist	.0045	.0021	.0012

SOURCE: ADL Estimates, EPA (Appendices H & I).

TABLE O-2 (Contd.)

	Low Volume	Medium Volume	High Volume
PRE-VAPOR RECOVERY ECONOMICS			
Net Margin (BFIT)	(.0202)	.0022	.0140
Multiply by Annual Gallonage	600,000	1,200,000	1,800,000
Total [illegible] Contribution (BFIT)	(12,120)	2,640	25,200
Supplier Investment	$170,000	$200,000	$200,000
Required Capital Recovery	23,800	28,000	28,000
Surplus (Deficit) of Total Contribution Over Required Contribution	(35,920)	(25,360)	(2,800)
COSTS OF VAPOR RECOVERY			
-- Vapor Balance	1,778	1,627	1,456
-- Vacuum Assist	2,702	2,485	2,212
PASSED ON COSTS*			
-- Vapor Balance	480	960	1,456
-- Vacuum Assist	720	1,440	2,212
NET CHANGE IN CONTRIBUTION			
-- Vapor Balance	(1,298)	(667)	0
-- Vacuum Assist	(1,982)	(1,045)	0

* At $.0008/.0012 per gallon for Vapor Balance/Vacuum Assisted.

SOURCE: ADL Estimates, EPA (Appendices H & I).

TABLE O-3

OPEN DEALER OPERATION
(dollars)

	Low Volume	Medium Volume	High Volume
Vapor Recovery Investment			
-- Vapor Balance	5,200	6,300	7,400
-- Vacuum Assist	9,500	10,600	11,600
Vapor Recovery O&M Costs			
-- Vapor Balance	240	360	480
-- Vacuum Assist	490	550	620
Annualized Investment Charge: 27.7% of Initial Investment Costs (During First Five Yrs			
-- Vapor Balance	1,440	1,745	2,050
-- Vacuum Assist	2,632	2,936	3,213
Total Annual Vapor Recovery Costs*			
-- Vapor Balance	1,680	2,105	2,530
-- Vacuum Assist	3,122	3,486	3,833
Recovery Credit			
-- Vapor Balance	120	336	552
Net Annual Vapor Recovery Cost			
-- Vapor Balance	1,560	1,769	1,978
-- Vacuum Assist	3,002	3,150	3,281
Net Vapor Recovery Cost in Cents Per Gallon			
-- Vapor Balance	.0130	.0049	.0033
-- Vacuum Assist	.0250	.0088	.0055

*During first 5 years only.

SOURCE: ADL Estimates, EPA (Appendices H & I).

TABLE O-3 (Contd.)

	Low Volume	Medium Volume	High Volume
PRE-VAPOR RECOVERY ECONOMICS			
Net Margin (BFIT)	.0168	.0145	.0177
Multiply by Annual Gallonage	120,000	360,000	600,000
Total Contribution (BFIT)	(2,016)	5,220	10,620
Dealer Investment	$40,000	$65,000	$120,000
Required Capital Contribution	5,080	8,255	15,240
Surplus (Deficit) of Total Contribution Over Required Contribution	-	(3,035)	(4,620)
COSTS OF VAPOR RECOVERY*			
-- Vapor Balance	1,560(120)	1,769(24)	1,978(+72)
-- Vacuum Assist	3,002(370)	3,150(214)	3,281(68)
PASSED ON COSTS**			
-- Vapor Balance	396	1,188	1,978
-- Vacuum Assist	660	1,980	3,281
NET CHANGE IN CONTRIBUTION			
-- Vapor Balance	(1,164)	(581)	0
-- Vacuum Assist	(2,342)	(1,170)	0

* Second 5 years in parentheses

**At $.0033/.0055 per gallon for Vapor Balance/Vacuum Assisted, for the first five years of operation only

SOURCE: ADL Estimates, EPA (Appendices H & I).

TABLE O-4

DIRECT/INDEPENDENT SELF SERVICE OPERATION
(dollars)

	Low Volume	Medium Volume	High Volume
Vapor Recovery Investment			
-- Vapor Balance	9,600	10,800	11,600
-- Vacuum Assist	13,600	14,600	15,400
Vapor Recovery O&M Costs			
-- Vapor Balance	720	840	960
-- Vacuum Assist	750	840	875
Annualized Investment Charge: 27.7% of Initial Investment Costs*			
-- Vapor Balance	2,659	2,992	3,213
-- Vacuum Assist	3,767	4,044	4,266
Total Annual Vapor Recovery Costs*			
-- Vapor Balance	3,379	3,832	4,173
-- Vacuum Assist	4,517	4,884	5,141
Recovery Credit			
-- Vapor Balance	1,056	1,536	2,052
Net Annual Vapor Recovery Cost			
-- Vapor Balance	2,323	2,296	2,121
-- Vacuum Assist	3,461	3,348	3,089
Net Vapor Recovery Cost in Cents Per Gallon			
-- Vapor Balance	.0019	.0013	.0009
-- Vacuum Assist	.0029	.0019	.0013

* First 5 years only.

SOURCE: ADL Estimates, EPA (Appendices H & I).

TABLE O-4 (Contd.)

	Low Volume	Medium Volume	High Volume
PRE-VAPOR RECOVERY ECONOMICS			
Net Margin (BFIT)	(.0033)	.0072	.0086
Multiply by Annual Gallonage	1,200,000	1,800,000	2,400,000
Total Contribution (BFIT)	(3,960)	12,960	20,640
Supplier Investment	136,000	141,000	147,000
Required Capital Contribution	19,040	19,740	20,580
Surplus (Deficit) of Total Contribution Over Required Contribution	(23,000)	(6,780)	60
COSTS OF VAPOR RECOVERY			
-- Vapor Balance	2,323	2,296	2,121
-- Vacuum Assist	3,461	3,348	3,089
PASSED ON COSTS*			
-- Vapor Balance	960	1,440	1,920
-- Vacuum Assist	1,440	2,160	2,880
NET CHANGE IN CONTRIBUTION			
-- Vapor Balance	(1,363)	(856)	(201)
-- Vacuum Assist	(2,021)	(1,188)	(209)

* At $.0008/.0012 per gallon for Vapor Balance/Vacuum Assisted

SOURCE: ADL Estimates, EPA (Appendices H & I).

TABLE O-5

CONVENIENCE STORE, SELF SERVICE STATION
(dollars)

	Low Volume	Medium Volume	High Volume
Vapor Recovery Investment			
-- Vapor Balance	4,300	4,300	4,500
-- Vacuum Assist	8,700	8,700	8,900
Vapor Recovery O&M Costs			
-- Vapor Balance	120	120	180
-- Vacuum Assist	425	425	460
Annualized Investment Charge: 20.7% of Initial Investment Costs			
-- Vapor Balance	890	890	932
-- Vacuum Assist	1,801	1,801	1,842
Total Annual Vapor Recovery Costs			
-- Vapor Balance	1,010	1,010	1,112
-- Vacuum Assist	2,226	2,226	2,302
Recovery Credit			
-- Vapor Balance	108	204	360
Net Annual Vapor Recovery Cost			
-- Vapor Balance	902	806	752
-- Vacuum Assist	2,118	2,022	1,942
Net Vapor Recovery Cost in Cents Per Gallon			
-- Vapor Balance	.0075	.0034	.0018
-- Vacuum Assist	.0177	.0084	.0046

SOURCE: ADL Estimates, EPA (Appendices H & I).

TABLE O-5 (Contd.)

	Low Volume	Medium Volume	High Volume
PRE-VAPOR RECOVERY ECONOMICS			
Net Margin (BFIT)	.0080	.0150	.0233
Multiply by Annual Gallonage	120,000	240,000	420,000
Total Contribution (BFIT)	960	3,600	9,786
Supplier Investment	$10,000	$20,000	$22,000
Required Capital Contribution	3,002	3,160	3,476
Surplus (Deficit) of Total Contribution Over Required Contribution	(2,042)	440	6,310
COSTS OF VAPOR RECOVERY			
-- Vapor Balance	902	806	752
-- Vacuum Assist	2,118	2,022	1,942
PASSED ON COSTS*			
-- Vapor Balance	96	192	336
-- Vacuum Assist	144	288	504
NET CHANGE IN CONTRIBUTION			
-- Vapor Balance	(806)	(614)	(416)
-- Vacuum Assist	(1,974)	(1,734)	(1,438)

* At $.0008/.0012 per gallon for Vapor Balance/Vacuum Assisted

SOURCE: ADL Estimates, EPA (Appendices H & I).

APPENDIX P

VAPOR RECOVERY INVESTMENT FOR ESTIMATED 1981 SERVICE STATION POPULATION

TABLE P-1

I. BALANCE - COST PASS THROUGH	OUTLETS	AVERAGE # NOZZLES	TOTAL OPERATING EXPENSES ($MM)	TOTAL INVESTMENT ($MM)	INTEREST RATE	REPAYMENT PERIOD	TOTAL INTEREST ($MM)	TOTAL PAYMENTS (Int. & Princ.) ($MM)
Leasee	54018	8	25.9	400	13.9%	7	251	651
Direct-Major	8788	12	6.3	84	7.34%	8	31	115
Direct-Independent	15340	15	13.8	172	11%	6	72	243
Open Dealer	40805	6	14.7	257	15%	3	81	338
C Store	19767	2	2.4	85	11%	6	36	121
Total	138718	-	63.1	998	-	-	471	1468
II. BALANCE - NO COST PASS THROUGH								
Leasee	54018	8	25.9	400	13.9%	7	251	651
Direct-Major	8788	12	6.3	84	7.34%	8	31	115
Direct-Independent	15430	15	13.8	172	11%	6	72	243
Open Dealer	35457	6	12.8	223	15%	3	71	294
C Store	18352	2	2.2	79	11%	6	33	112
Total	131995	-	61.0	958	-	-	458	1415
III. VACUUM ASSIST - COST PASS THROUGH								
Leasee	54018	8	33.5	626	13.9%	7	394	1020
Direct-Major	8788	12	6.6	120	7.34%	8	42	162
Direct-Independent	15430	15	12.9	231	11%	6	96	325
Open Dealer	37013	6	20.4	392	15%	3	124	516
C Store	19634	2	8.3	171	11%	6	71	242
Total	134793	-	81.7	1540	-	-	727	2265
IV. VACUUM ASSIST - NO COST PASS THROUGH								
Leasee	54018	8	33.5	626	13.9%	7	394	1020
Direct-Major	8788	12	6.6	120	7.34%	8	42	162
Direct-Independent	15430	15	12.9	231	11%	6	96	325
Open Dealer	31662	6	13.4	275	15%	3	87	362
C Store	17438	2	7.4	152	11%	6	63	215
Total	127246	-	73.8	1404	-	-	682	2084

Source: ADL Estimates, EPA (Appendix H).

APPENDIX Q

STAGE I VAPOR RECOVERY WORKSHEETS

TABLE Q-1

STAGE I CAPITAL CONSTRAINTS CLOSURE ESTIMATES

I LEASEE DEALERS

Marketer	Estimated Volume Breakeven Cut-off (1000 Gal/Mth)	Number of Oultets Below Breakeven
Jobbers	27.5	9007

II OPEN DEALERS

Supplier	Breakeven Cut-off (1000 Gal/Mth)	# of Outlets
Major	15.4	366
Regional Refiner	15.4	16
Independent Mktr/Whols.	15.4	16
Jobber	15.4	852
TOTAL	-	1250

III DIRECT-INDEPENDENTS

Supplier	Volume Cut-off (1000 Gal/Mth)	# of Outlets
Jobbers	50	2776
Independent Mktrs.	50	2497
TOTAL		5173

TABLE Q-2

TYPE STATION - OPEN DEALER
STAGE I FINANCIAL IMPACT ($/YEAR)

Throughput Level	Low	Medium	High
Monthly Volume (000 gal)	10	30	50
Average # Tanks/Station	3	3	4
Stage I Investment	1,500	1,500	1,700
Stage I O&M Expense	-	-	-
Annualized Investment (27.7% of Investment)	416	416	471
Total Stage I Annual Costs	416	416	471
Recovery Credit	-	-	-
Net Stage I Costs	416	416	471

	$/Gallon		
Unit Stage I Costs	0.0035	0.0012	0.0008
Competitive Cost Pass Through	0.0007	0.0007	0.0007
Net Stage I Absorbed Costs	0.0028	0.0005	0.0000
Net Margin (BFIT) Before Stg. I	(0.0168)	0.0145	0.0177
Net Margin (BFIT) After Stg. I	(0.0196)	0.0100	0.0177

	000 Gal/Mth	# Outlets
Breakeven Volume Before Stage I	15.4	
Breakeven Volume After Stage I	18.4	
Estimated # Marginal Outlets Created by Stage I		781
Estimated # of Added Closures Due to Stage I		312

TABLE 3

TYPE STATION - DIRECT SALARY (INDEPENDENT) STAGE I FINANCIAL IMPACT ($/YEAR)

Throughput Level	Low	Medium	High
Monthly Volume (000 gal)	100	150	200
Average # Tanks/Station	4	5	5
Stage I Investment	1,700	1,900	1,900
Stage I O&M Expense	-	-	-
Annualized Investment (27.7% of Investment)	471	526	526
Total Stage I Annual Costs	471	526	526
Recovery Credit	-	-	-
Net Stage I Costs	471	526	526

	$/Gallon		
Unit Stage I Costs	0.0004	0.0003	0.0002
Competitive Cost Pass Through	0.0002	0.0002	0.0002
Net Stage I Absorbed Costs	0.0002	0.0001	0.0000
Net Margin (BFIT) Before Stg. I	(0.0033)	0.0072	0.0086
Net Margin (BFIT) After Stg. I	(0.0035)	0.0071	0.0086

	000 Gal/Mth	# Outlets
Breakeven Volume Before Stage I	108.3	
Breakeven Volume After Stage I	110.0	
Estimated # Marginal Outlets Created by Stage I		5
Estimated # of Added Closures Due to Stage I		2

TABLE Q-4

TYPE STATION - DIRECT SALARY (MAJOR)
STAGE I FINANCIAL IMPACT ($/YEAR)

Throughput Level	Low	Medium	High
Monthly Volume (000 gal)	50	100	150
Average # Tanks/Station	4	4	5
Stage I Investment	1,700	1,700	1,900
Stage I O&M Expense	-	-	-
Annualized Investment (27.7% of Investment)	352	352	393
Total Stage I Annual Costs	352	352	393
Recovery Credit	-	-	-
Net Stage I Costs	352	352	393

	$/Gallon		
Unit Stage I Costs	0.0006	0.0003	0.0002
Competitive Pass Through	0.0002	0.0002	0.0002
Net Stage I Absorbed Costs	0.0004	0.0001	0.0000
Net Margin (BFIT) Before Stg. I	(0.0205)	0.0048	0.0065
Net Margin (BFIT) After Stg. I	(0.0209)	0.0047	0.0065

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	000 Gal/Mth	# Outlets
Breakeven Volume Before Stage I	91.7	
Breakeven Volume after Stage I	92.0	
Estimated # Marginal Units Created by Stage I		80
Estimated # of Added Closures Due to Stage I		0

TABLE Q-5

TYPE STATION - "C" STORE
STAGE I FINANCIAL IMPACT ($ YEAR)

	Low	Medium	High
Monthly Volume (000 Gal.)	10	20	35
Average No. of Tanks/Station	2	2	3
Stage I Investment	1,300	1,300	1,500
Stage I O&M Expense	-	-	-
Annualized Investment (20.7% of Investment)	269	269	311
Total Stage I Annual Costs	269	269	311
Recovery Credit	-	-	-
Net Stage I Costs	269	269	311
		$/Gallon	
Unit Stage I Costs	.0022	.0011	.0007
Competitive Cost Pass-Through	.0002	.0002	.0002
Net Stage I Absorbed Costs	.0020	.0009	.0005
Net Margin (BFIT) Before Stage I	.0080	.0150	.0233
Net Margin (BFIT) After State I	.0060	.0141	.0228

	000 Gal/Mth.	# Outlets
Break Even Volume Before Stage I	5.8	-
Break Even Volume After Stage I	7.5	-
Estimated No. Marginal Units Created by Stage I	-	60
Estimated No. Added Closures Due to Stage I	-	0

TABLE Q-6

TYPE STATION - LESSEE DEALER
STAGE I FINANCIAL IMPACT ($/YEAR)

	Low	Medium	High
Monthly Volume (000 Gal.)	20	35	80
Average No. of Tanks/Station	3	4	4
Stage I Investment	1,500	1,700	1,700
Stage I O&M Expense	-	-	-
Annualized Investment (20.7% of Investment)	311	311	352
Total Stage I Annual Costs	311	311	352
Recovery Credit	-	-	-
Net Stage I Costs	311	311	352
		$/Gallon	
Unit Stage I Costs	.0013	.0007	.0004
Competitive Cost Pass-Through	.0007	.0007	.0002
Net Stage I Absorbed Costs	.0006	.0000	.0002
Net Margin (BFIT) Before Stage I	(.0205)	.0048	.0065
Net Margin (BFIT) After Stage I	(.0211)	.0048	.0065

	000 Gal/Mth.	# Stations
Break-Even Volume Before Stage I	27.5	
Break-Even Volume After Stage I	27.8	
Estimated No. Marginal Units Created by Stage I		312
Estimated No. Added Closures Due to Stage I		206

TABLE Q-7

TYPE STATION - OPEN DEALER
STAGE COAXIAL SYSTEM ($ YEAR)

	Low	Medium	High
Monthly Volume (000 Gal.)	10	30	50
Average No. of Tanks/Station	3	3	4
Stage I Investment	450	450	450
Annualized Investment (27.7% of Investment)	125	125	125
		$/Gallon	
Unit Stage I Costs	.0010	.0003	.0002
Competitive Cost Pass-Through	.0002	.0002	.0002
Net Stage Absorbed Costs	.0007	.0001	.0000
Net Margin (BFIT) Before Stage I	(.0108)	.0145	.0177
Net Margin (BFIT) After Stage I	.0175	.0146	.0177

	000 Gal/Mth.	# Outlets
Break-Even Volume Before Stage I	15.4	-
Break-Even Volume After Stage I	16.5	-
Estimated No. Added Closures Due to Stage I		287

FIGURE Q-1

SERVICE STATION BREAKEVEN POINT - PRE/POST STAGE I VAPOR RECOVERY

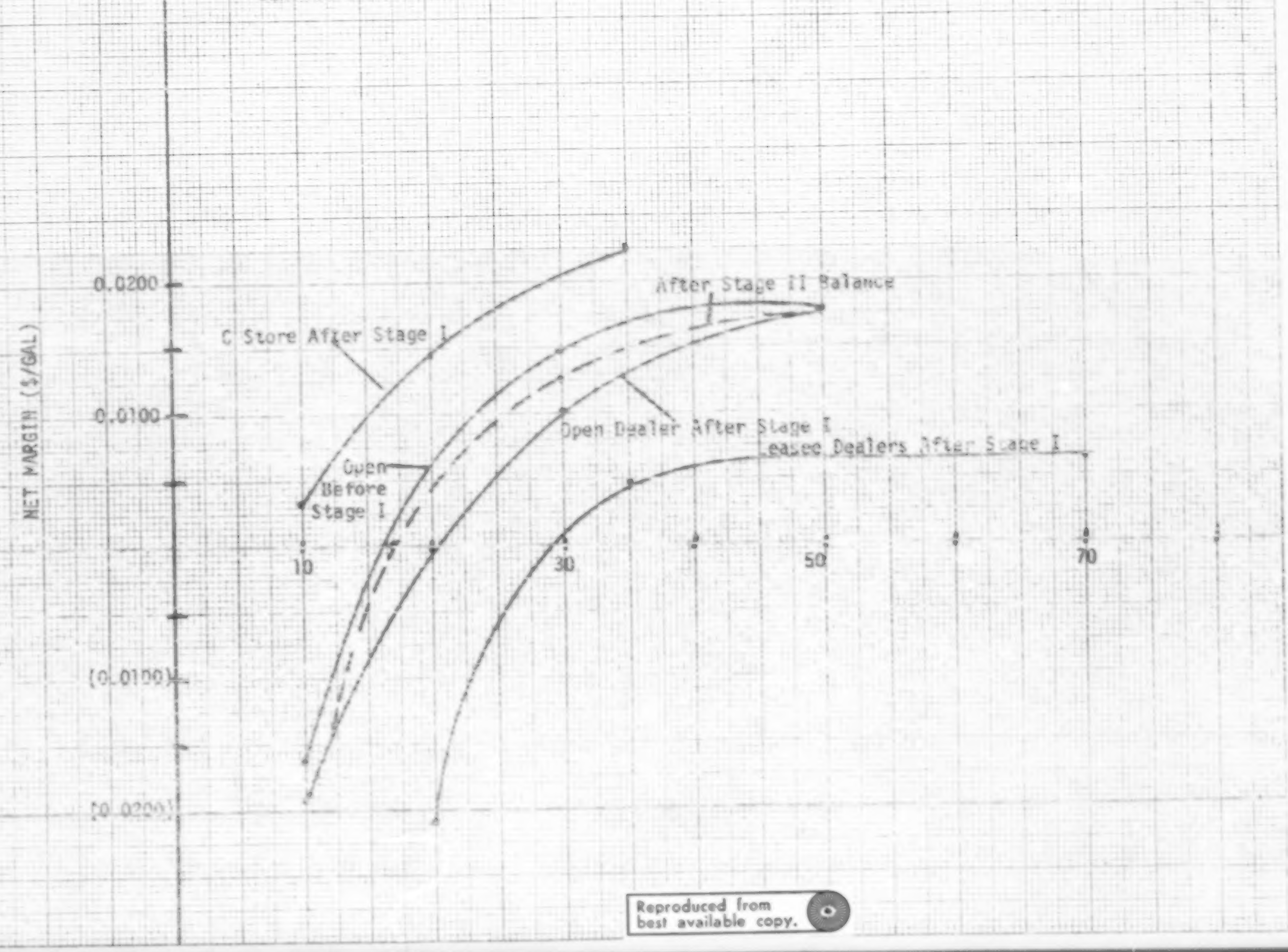

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FIGURE Q-2

POST STAGE I SERVICE STATION BREAKEVEN POINT